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**VERIFICATION OF COLDWORKING  
AND INTERFERENCE LEVELS AT  
FASTENER HOLES**



**Beth Matlock**

**Technology for Energy Corporation (TEC)  
10737 Lexington Drive  
Knoxville, TN 37932-3294**

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**THIS IS A SMALL BUSINESS INNOVATION RESEARCH (SBIR) PHASE I REPORT.**

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//Signature//

Dr. David Stargel  
Research Aerospace Engineer

//Signature//

Capt. Scott Bjorge  
Deputy Chief, Structural Mechanics Branch

//Signature//

DAVID M. PRATT, PhD  
Technical Advisor  
Structures Division

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## Introduction

The purpose of SBIR AF04-241 was for Technology for Energy Corporation (TEC), as prime contractor, to develop a structural health assessment system for cold-worked holes. TEC modified an existing x-ray diffraction system (XRD), developed under recent SBIRs (Contract Numbers F09650-01-M0955 and F09650-02-C0517), to determine the residual stresses at cold-worked fastener holes. TEC then joined this XRD measurement capability with material-based life prediction technology developed by VEXTEC Corporation acting as a subcontractor to TEC.

TEC developed a measurement and assessment capability to quantitatively determine the structural integrity around cold-worked fastener holes in various locations on aircraft, thereby assessing the aircraft's overall health, targeting necessary maintenance, improving the aircraft readiness and air worthiness, and reducing its life-cycle cost. This capability will enable the Air Force to improve its aircraft life cycle management by a reliable, quantifiable, nondestructive means, instead of using other unreliable methods or overly conservative estimates that result in higher inspection and repair costs. Extending the operating life cycles of a large number of aircraft would result in substantial savings for the Department of Defense.

The purpose of SBIR Phase I Topic AF04-241 was to show proof of principle for a prototype stress measurement system that would be coupled with a life assessment model to conceptualize a health assessment system for aircraft. Specifically, the work concentrated on differentiating levels of cold-working in and around fastener holes which are subjected to fatigue loading in aircraft structures.

This effort was divided into six major tasks as summarized below.

- Task 1: Establish validity of advanced x-ray diffraction techniques
- Task 2: Establish measurement parameters based on USAF needs
- Task 3: Establish differentiation criteria
- Task 4: Blind-test measurements
- Task 5: Conceptualize a prototype health assessment system for use on and around aircraft
- Task 6: Write the Phase I final report

The SBIR Phase I successfully proved the concept feasibility of using the TEC XRD approach to distinguish between varying degrees of cold-working at fastener holes. We have also analyzed the measurement results and found they can provide the experimental data necessary to assess the component microstructure nondestructively. The Phase II effort will provide the AF with a structural health assessment system as originally proposed.

The program started with a kick-off meeting at Wright-Patterson Air Force Base to discuss the proposed work and gather important feedback from representatives for various aircraft platforms and programs. Based on the feedback, the work plan was adjusted to target the primary Air Force needs for this program. The project work plan and results are discussed in this paper.

## Work Plan

A kick-off meeting was held at Wright-Patterson AFB on June 28, 2004. Representatives from several areas at Wright-Patterson and from Warner-Robins participated in discussions pertinent to the program's success. Specifically, alloy selection and the most common hole sizes were established for this study. The applicability of this program to new and aging aircraft was noted and discussed.



Based on feedback from the kick-off meeting, standard cold-worked hole samples were ordered from Stress Wave. Aluminum 2024-T3 and 7075-T6 alloys were selected. Hole sizes selected were 1/4" and 5/6". Each standard had 7 holes in it. Hole 0 was not cold worked. Holes 1 through 6 had increasing amounts of cold working imparted by the split sleeve mandrel technique. Appendix A contains the documentation for the Stress Wave standard. In addition to these documented standards, the Air Force supplied 20 standards, each with a single 1/4" hole in the center of the standard. The documentation for these standards was not provided to TEC; thus, these standards represented a blind test to see if x-ray diffraction (XRD) techniques could distinguish between non cold-worked holes and holes that had been cold worked to various levels.

As proposed, TEC started the program by verifying x-ray diffraction techniques on aluminum alloy samples. Accurate measurement of residual stresses in textured materials such as wrought aluminum has been difficult with some commonly available techniques. Traditionally, many laboratories use chromium radiation at  $142^{\circ} 2\theta$ . These parameters work satisfactorily on fine-grained aluminum alloys with random grain orientation. Chromium radiation, due to shallow penetration compared to copper radiation, does not give the volume of diffraction to overcome large grain size and preferred orientation effects associated with wrought aluminum. Higher precision is accomplished by measuring diffraction peaks at high back-reflection angles. Thus, measurements at  $160^{\circ} 2\theta$  are more precise than those at  $142^{\circ} 2\theta$ .

TEC verified measurements on stress-free aluminum powder and 2024, 6061 and 7075 aluminum alloy plates using copper radiation at  $160^{\circ} 2\theta$ . These measurements were made using a TEC Model 1630 X-ray Diffraction System and are contained in Appendix B.

The ultimate goal of this work was to conceptualize a health assessment system that would use XRD data gathered by a portable system along with other material properties, usage profiles etc. The next step in the program was to establish the XRD measurement parameters based on Air Force needs. MAX, Miniature Advanced X-ray System, is a portable XRD system developed under a DoD SBIR (Contract Numbers F09650-01-M0955 and F09650-02-C0517). This system was designed to make measurements in hard-to-access locations on aircraft. It consists of a 3W miniature copper x-ray tube and two miniature position-sensitive proportional counter detectors incorporated in a fixed head design. This system was used to make measurements on the Stress Wave and Air Force standards to determine if valid measurements comparable to data from the 1630 system could be obtained.

MAX was carried to Tinker Air Force Base to encourage discussions about how this system could be used on aircraft at the depot and to obtain more information about Air Force needs. It is probable that the system could be easily implemented as a data acquisition and analysis tool on aircraft in hangers and on the flight line. Data acquisition times of 2-3 minutes were deemed acceptable. The existing positioning plate coupled with tape could be used to gather data at a large number of measurement sites. Line power for the system was also considered acceptable.

The third task this program was to establish differentiation criteria for non cold- work holes and holes cold-worked to varying levels. The majority of the XRD measurements were made during this task. Baseline measurements were made on a 1630 system and duplicated with MAX. The measurements were made on the Stress Wave standards first followed by measurements on the Air Force standards.

Initial measurements were made varying collimator size, acquisition time, and measurement location. Based on these results, the optimum collimator sizes of 4-5 mm in diameter were selected. Smaller-sized collimators could show a higher degree of stress gradient separation along the radial distance from the hole edge; however, the 3-W MAX system could provide data quicker using the larger collimator.

The measurement times used for the 1630 system ranged from 4-6 minutes per measurement. MAX measurement times were generally 5 minutes for the standard measurement. Enhanced MAX software has dropped the required measurement time to 2-4 minutes.

Measurement locations concentrated on positions along a radial line from the hole edge. Initial measurements were made on both sides of the standards at different points around the hole diameter. In all cases, measurements were made in a circumferential direction with respect to the hole. Consistent data were obtained on the front side of the standards at radial positions in the transverse direction of the standard. Subsequent data were also obtained on the Air Force standards along a radial line in the longitudinal direction of the standard. The radial positions used were 0.05", 0.10" and 0.15" from the hole edge.

The final analysis task was to conceptualize a prototype health assessment system for use on and around aircraft. TEC teamed with VEXTEC to implement this task. Data from the 1630 system were sent to Richard Holmes of VEXTEC for analysis of how measurement components could be used in existing VEXTEC models. VEXTEC identified residual stress, diffraction peak integrated intensity, and diffraction peak width as parameters related to microstructural properties. The existing models use microstructural properties to characterize fatigue capability and in turn, provide a significant predictor of structural health.

## Results and Discussion

The residual stress and diffraction peak data are presented in Tables 1-3. These data are also shown graphically in Figures 1-10. Data from the 1630 system were used primarily in analyzing the condition around the holes and ranking the Air Force standards. In about half the cases, MAX data compared favorably to the 1630 data. For the cases where the comparison was not favorable, two factors attributed to the differences. First, MAX was initially set up with the center of the detector set at  $162^{\circ} 20'$ . On the MAX system, many of the peak positions were registering at approximately  $163^{\circ} 20'$ . A new head was designed with the center of the detectors set at  $163^{\circ} 20'$ . The second reason for differences in results related to the data analysis software for MAX. TEC has been able to reanalyze these data with software developed for a TEC 4000 system. The reanalysis shows much better comparison in the data to the 1630 system. Work is currently underway to upgrade the MAX analysis routines.

Residual stresses coupled with the diffraction peak widths were used to rank the samples from minimal or no cold working to maximum cold working. Residual stresses are the stresses that remain in a body after all external loads are removed. These stresses can be harmful or beneficial in the service life of a part since they combine directly with loading stresses for a total stress in the part. In fatigue environments, compressive residual stresses are usually beneficial and help prevent crack initiation and growth. The diffraction peak width is a qualitative indication of plastic strain in a part. As work hardening increases, the peak width broadens. The introduction of plastic strain or deformation in turn changes the levels of residual stresses, which are related to elastic strains. By comparing the magnitudes of the residual stresses and peak widths along a radial line from the hole edge, it is possible to distinguish non cold-worked holes from cold-worked holes.

Baseline measurements were made on both the Stress Wave and Air Force standards. These measurements played an important part in characterizing the stresses around the cold-worked holes. For the Stress Wave standards, the baseline residual stresses were compressive,  $-13.4 \pm 7.2$  ksi for the 7075-T651 standard and  $-25.4 \pm 4.4$  ksi for the 2024-T351 standard. In contrast, the baseline stresses for the Air Force standards were low, ranging from  $-0.3 \pm 1.4$  ksi to  $-5.1 \pm 2.4$  ksi in the transverse direction. When baseline measurements were made in the longitudinal direction, however, stresses ranged from  $-1.2 \pm 1.0$  ksi to  $-22.2 \pm 3.0$  ksi. These differences indicate that the Stress Wave and Air Force standards were probably processed differently prior to drilling and/or cold-working the holes. Additionally, the baseline peak width was higher than some of the peak widths for the cold-worked holes in both sets of standards. These factors made it difficult to apply any set rules for ordering the Air Force standards based on the Stress Wave results. These results indicate that baseline measurements are useful in determining if a hole has been cold-worked.

The amount of cold working for the Stress Wave standards ranged from 0 to 5.33% for the 7075-T651 standard and 0 to 5.38% for the 2024-T351 standard. Based on a general comparison of the Stress Wave and Air Force standards, it is expected that the Air Force standards had a similar range of cold-working.

Measurements from the Air Force standards in the transverse direction with respect to the bars were ordered as follows from no or minimal cold working to the maximum amount of cold working:

AF2, AF1, AF3, AF4, AF5,  
AF17, AF10, AF11, AF8, AF19,  
AF9, AF7, AF14, AF16, AF20,  
AF6, AF18, AF15, AF13, AF12.

The measurements were repeated on the Air Force standards. This time the measurements were made  $90^\circ$  from the first set so the direction was longitudinal with respect to the bar. The results were used to again order the samples from minimal cold-working to maximum cold working. In this case it was convenient to group the samples in four groups.

AF5, AF2, AF4, AF3, AF1 (no or minimal cold-working)  
AF9, AF6, AF8, AF7, AF10  
AF13, AF12, AF15, AF11, AF14  
AF16, AF18, AF17, AF19, AF20 (maximum cold-working)

Both sets of measurements identified the first five samples as having no or minimal cold working. Differences in the ordering suggest that measurements should be made along radial lines that are  $90^\circ$  apart. The differences in the stresses and peak widths for these measurements were attributed to directionality of the cold-working process and/or effects of the sample geometry. The residual stress data were sent to VEXTEC for analysis and an assessment of how these results could be incorporated in their fatigue life model. The VEXTEC summary is provided in Appendix C. VEXTEC identified the residual stress, peak width, and the diffraction peak integrated intensity as pertinent data that could be related to microstructural properties. The residual stress and peak width were emphasized in this study for cold-working analysis. The integrated intensity data are related to grain size and preferred orientation of the grains, or texture. Grain size, texture and cold-working are factors that affect the microstructure. These microstructural properties are used in VEXTEC's existing models for life prediction.

Residual stresses measured by x-ray diffraction are a measure of surface stresses only. Stresses in the outer fibers of a component can differ from stresses measured by other techniques and from analytically derived stresses. Surface stresses can be altered by any action that results in plastic flow. The final stress state results from the combinations of loadings that occur during processing and service history. Because beneficial stresses can come from different processes, the final stress state is a better indicator of useful life than the processes used to affect the stress state.

## Conclusions

TEC proved the validity of using the XRD technique to distinguish non cold-worked from cold-worked holes. Baseline measurements made on a TEC 1630 were generally verified using MAX. MAX is a miniaturized, portable XRD system developed for the Air Force under separate SBIR programs. In cases where there were differences in the data, the differences were identified and corrected through enhanced data analysis routines.

The XRD data were supplied to VEXTEC for analysis. VEXTEC assessed the validity of using these data in their life prediction models. VEXTEC identified residual stress, diffraction peak width, and diffraction peak integrated intensities as pertinent information for inclusion in their models. These factors are related to the amount of cold working and to microstructural features such as grain size and preferred orientation (texture). Microstructural information is currently used by VEXTEC in their life prediction models.

This SBIR shows that the elements exist to develop a health assessment system that will enable the Air Force to improve its aircraft life cycle management. These elements include a portable, nondestructive XRD system that can safely provide reliable results quickly, data which indicate amounts of cold working and microstructural information and a life-prediction model that uses these data. TEC and VEXTEC are ready to develop this health monitoring system as a Phase II effort.

TABLE 1.  
USAF COLD-WORKED HOLES STANDARDS

Standard	System	Circumferential Residual Stress, ksi (Peak Width, <sup>0</sup> )			
		.05" from Edge of Hole	.10" from Edge of Hole	.15" from Edge of Hole	Baseline
AF1	1630, trans.	-4.4 ±1.5 (3.00)	-4.6 ±1.8 (2.88)	-4.4 ±1.2 (2.76)	-2.2 ±1.9 (3.61)
	1630, long.	-22.5 ±1.8 (4.29)	-17.1 ±1.8 (4.23)	-19.7 ±1.8 (4.18)	-19.4 ±2.6 (4.06)
	MAX	-17.4 ±3.3 (2.74)	-14.5 ±2.7 (2.41)	-16.6 ±1.3 (1.80)	
AF2	1630, trans.	-2.3 ±2.4 (3.28)	-0.3 ±1.2 (3.30)	-1.1 ±1.6 (2.99)	-1.4 ±1.9 (3.59)
	1630, long.	-9.5 ±1.2 (4.55)	-6.2 ±1.5 (4.42)	-6.8 ±1.5 (4.28)	-5.9 ±2.0 (3.91)
	MAX	-25.2 ±1.6 (1.79)	+7.5 ±4.1 (1.76)	-6.6 ±1.1 (1.63)	
AF3	1630, trans.	-11.6 ±3.7 (3.03)	-2.8 ±2.1 (3.10)	-2.3 ±0.9 (3.12)	-0.3 ±1.4 (3.98)
	1630, long.	-20.5 ±2.0 (4.52)	-19.1 ±1.9 (4.73)	-18.7 ±2.3 (4.21)	-18.3 ±1.7 (4.18)
	MAX	-12.8 ±1.7 (2.25)	-4.4 ±1.6 (2.40)	+3.5 ±7.6 (2.14)	
AF4	1630, trans.	-5.8 ±1.7 (3.24)	-4.5 ±2.0 (3.33)	-3.6 ±1.6 (3.03)	-1.0 ±1.2 (3.60)
	1630, long.	-17.2 ±2.0 (4.20)	-16.8 ±2.2 (4.51)	-18.7 ±2.2 (4.19)	-22.2 ±3.0 (3.95)
	MAX	-2.7 ±3.9 (2.04)	-7.6 ±4.2 (2.54)	-10.2 ±* (2.53)	
AF5	1630, trans.	-9.9 ±1.8 (3.25)	-5.5 ±1.7 (3.07)	-3.8 ±1.5 (3.07)	-1.0 ±1.3 (3.84)
	1630, long.	-4.8 ±1.1 (4.32)	-2.8 ±1.4 (4.37)	-1.2 ±1.4 (4.23)	-6.6 ±1.7 (4.25)
	MAX	-1.8 ±1.3 (1.64)	0.4 ±1.0 (2.02)	-1.0 ±1.4 (2.87)	
AF6	1630, trans.	-40.1 ±1.4 (3.67)	-23.8 ±2.9 (3.33)	-0.7 ±2.5 (2.90)	-4.0 ±1.4 (3.63)
	1630, long.	-31.6 ±1.9 (4.41)	-16.4 ±1.8 (4.41)	-5.7 ±1.8(4.65)	-2.0 ±1.3 (3.75)
	MAX	-40.7 ±1.7 (1.93)	-33.1 ±2.4 (1.76)	-8.6 ±5.6 (1.42)	
AF7	1630, trans.	-30.9 ±2.3 (3.14)	-17.7 ±2.8 (3.53)	-6.8 ±2.1 (3.35)	-5.1 ±1.1 (3.90)
	1630, long.	-34.5 ±2.0 (4.67)	-22.8 ±2.0 (4.48)	-13.7 ±1.8 (4.42)	-19.9 ±1.3 (4.04)
	MAX	-33.1 ±1.4 (1.61)	-15.4 ±1.3 (1.61)	0.9 ±1.3 (1.54)	
AF8	1630, trans.	-27.6 ±2.6 (3.23)	-17.1 ±1.4 (3.32)	-6.9 ±1.4 (2.75)	-1.5 ±0.6 (3.13)
	1630, long.	-31.8 ±1.4 (4.20)	-26.1 ±2.1 (4.10)	-13.7 ±1.2 (4.12)	-17.6 ±1.5 (4.16)
	MAX	-27.5 ±1.9 (1.68)	-11.1 ±1.6 (2.09)	-0.5 ±2.3 (1.38)	

\* Uncertainty indeterminate

TABLE 1.  
USAF COLD-WORKED HOLES STANDARDS

Standard	System	Circumferential Residual Stress, ksi (Peak Width, <sup>0</sup> )			
		.05" from Edge of Hole	.10" from Edge of Hole	.15" from Edge of Hole	Baseline
AF9	1630, trans.	-30.7 ±1.8 (3.27)	-17.3 ±2.3 (3.46)	-6.6 ±2.2 (3.15)	-1.8 ±1.3 (3.38)
	1630, long.	-23.9 ±2.3 (4.60)	-9.3 ±2.1 (4.56)	-2.0 ±1.8 (4.04)	-4.9 ±2.3 (4.44)
	MAX	-30.6 ±1.9 (1.52)	-15.6 ±2.2 (1.83)	-25.4 ±1.7 (2.06)	
AF10	1630, trans.	-28.6 ±2.5 (3.39)	-17.0 ±1.9 (2.99)	-1.4 ±1.6 (3.07)	-4.1 ±2.6 (2.89)
	1630, long.	-39.3 ±3.0 (4.69)	-22.2 ±1.7 (4.65)	-14.7 ±1.1 (4.43)	-17.0 ±2.4 (3.92)
	MAX	-23.5 ±1.8 (1.49)	-25.6 ±1.6 (1.47)	-39.5 ±1.6 (1.48)	
AF11	1630, trans.	-27.6 ±1.2 (3.07)	-16.8 ±1.5 (3.35)	-4.5 ±2.2 (3.13)	-1.2 ±1.0 (3.63)
	1630, long.	-41.6 ±3.4 (5.04)	-31.1 ±1.8 (4.85)	-14.6 ±3.1 (4.50)	-3.9 ±1.4 (4.07)
	MAX	-31.8 ±2.1 (1.87)	-15.9 ±1.8 (0.53)	-6.2 ±1.6 (2.16)	
AF12	1630, trans.	-42.6 ±2.9 (2.76)	-22.8 ±2.3 (3.27)	-14.4 ±3.1 (3.12)	-5.1 ±2.4 (3.63)
	1630, long.	-41.4 ±2.4 (5.03)	-31.6 ±2.1 (4.65)	-25.8 ±2.4 (4.38)	-17.2 ±1.3 (4.26)
	MAX	-21.9 ±1.5 (1.49)	-18.2 ±1.9 (0.53)	-29.4 ±2.4 (1.07)	
AF13	1630, trans.	-40.1 ±1.8 (3.43)	-23.3 ±2.9 (3.40)	-4.7 ±1.6 (3.16)	-4.2 ±1.3 (2.86)
	1630, long.	-29.7 ±2.3 (4.78)	-17.5 ±2.0 (4.77)	-4.8 ±1.8 (4.70)	-2.6 ±1.4 (4.15)
	MAX	-18.7 ±2.6 (0.46)	-28.6 ±2.1 (1.80)	-2.7 ±1.1 (1.96)	
AF 14	1630, trans.	-34.7 ±3.1 (3.04)	-18.3 ±2.6 (2.96)	-8.6 ±2.0 (2.88)	-3.9 ±1.3 (3.45)
	1630, long.	-46.2 ±2.6 (4.66)	-30.3 ±2.3 (4.53)	-18.7 ±2.3 (4.59)	-18.8 ±1.9 (3.98)
	MAX	-32.1 ±2.6 (1.78)	-23.0 ±2.2 (1.68)	-20.7 ±1.4 (2.05)	
AF15	1630, trans.	-35.3 ±5.3 (3.47)	-24.5 ±2.5 (3.59)	-7.8 ±3.3 (3.21)	-3.4 ±1.7 (3.31)
	1630, long.	-35.3 ±1.7 (5.09)	-27.7 ±1.2 (4.79)	-16.1 ±1.0 (4.31)	-17.1 ±2.0 (3.96)
	MAX	-20.0 ±1.9 (1.67)	-27.0 ±3.1 (1.75)	3.6 ±2.1 (2.08)	

TABLE 1.  
USAF COLD-WORKED HOLES STANDARDS

Standard	System	Circumferential Residual Stress, ksi (Peak Width, <sup>0</sup> )			
		.05" from Edge of Hole	.10" from Edge of Hole	.15" from Edge of Hole	Baseline
AF16	1630, trans.	-34.7 ±3.1 (3.11)	-22.4 ±2.7 (3.31)	-9.9 ±3.1 (3.19)	-2.0 ±1.5 (3.77)
	1630, long.	-38.4 ±2.2 (4.67)	-30.2 ±1.4 (4.45)	-19.6 ±1.3 (4.35)	-19.0 ±2.4 (3.94)
	MAX	-31.2 ±1.6 (1.51)	-31.7 ±1.1 (1.60)	-12.4 ±1.9 (1.84)	
AF17	1630, trans.	-27.7 ±2.0 (3.55)	-10.8 ±2.0 (3.34)	1.5 ±1.8 (3.14)	-3.2 ±1.5 (3.30)
	1630, long.	-35.7 ±2.4 (4.85)	-22.3 ±1.9 (4.64)	-10.0 ±2.2 (4.67)	-1.2 ±1.0 (3.87)
	MAX	-39.0 ±1.3 (1.36)	-6.9 ±1.9 (1.66)	6.7 ±1.2 (2.09)	
AF18	1630, trans.	-39.3 ±2.4 (3.22)	-22.7 ±1.7 (3.33)	-7.8 ±2.5 (3.22)	-1.3 ±2.3 (3.51)
	1630, long.	-41.9 ±2.7 (4.68)	-24.3 ±4.1 (4.57)	-9.8 ±1.7 (4.28)	-6.8 ±1.3 (4.08)
	MAX	-43.9 ±4.4 (1.38)	-23.6 ±13.3 (1.91)	-6.0 ±1.6 (1.96)	
AF19	1630, trans.	-32.9 ±2.0 (3.34)	-15.7 ±3.0 (2.99)	-3.9 ±2.2 (2.90)	-3.9 ±1.3 (3.69)
	1630, long.	-39.5 ±2.4 (4.96)	-29.2 ±2.5 (4.71)	-16.7 ±2.8 (4.54)	-21.6 ±1.9 (3.95)
	MAX	-26.4 ±2.4 (1.47)	-30.8 ±1.9 (0.53)	2.1 ±1.9 (2.09)	
AF20	1630, trans.	-34.7 ±3.2 (3.67)	-22.5 ±1.9 (3.52)	-4.6 ±2.4 (3.48)	-3.5 ±1.2 (3.49)
	1630, long.	-33.6 ±3.2 (5.24)	-32.3 ±3.3 (5.00)	-22.0 ±3.7 (4.97)	-4.7 ±1.5 (3.77)
	MAX	-25.2 ±6.3 (1.93)	-13.8 ±1.4 (2.03)	-9.6 ±1.1 (1.85)	

TABLE 2.  
COLD WORKED HOLES STANDARDS

Location	System	Circumferential Residual Stress, ksi (Peak Width, <sup>0</sup> )		
		.05" from Edge of Hole	.10" from Edge of Hole	.15" from Edge of Hole
Standard 7320-001 2024-T351 1/4" Hole				
Baseline	1630	-25.4 ±4.4 (3.60)		
	MAX	-21.1 ±1.3 (1.96)		
Hole 0	1630	-24.3 ±3.5 (3.33)	-29.1 ±3.3 (3.50)	-23.7 ±2.2 (3.32)
	MAX	-25.9 ±2.4 (1.47)	-45.8 ±3.6 (1.42)	-22.4 ±4.5 (2.31)
Hole 1	1630	-26.9 ±3.0 (3.01)	-22.5 ±3.0 (2.98)	-15.5 ±2.4 (3.33)
	MAX	-20.2 ±1.6 (2.44)	-36.8 ±3.3 (0.91)	-32.7 ±1.7 (0.73)
Hole 2	1630	-29.5 ±1.1 (2.98)	-22.5 ±1.8 (3.05)	-18.9 ±2.9 (2.93)
	MAX	-22.8 ±2.8 (3.00)	-26.8 ±2.1 (0.80)	-15.9 ±1.9 (0.68)
Hole 3	1630	-30.2 ±4.3 (3.04)	-20.7 ±2.4 (2.89)	-14.8 ±3.1 (2.96)
	MAX	-77.4 ±3.2 (1.04)	-52.9 ±1.4 (0.65)	-12.6 ±1.1 (1.96)
Hole 4	1630	-37.3 ±3.7 (3.05)	-26.1 ±2.3 (2.91)	-15.6 ±2.1 (3.18)
	MAX	-38.9 ±2.3 (0.91)	-20.7 ±4.2 (0.53)	-16.8 ±2.1 (0.86)
Hole 5	1630	-31.7 ±2.2 (3.70)	-22.9 ±2.7 (2.95)	-18.5 ±2.6 (2.84)
	MAX	-38.7 ±3.7 (0.82)	-20.0 ±3.1 (0.99)	-48.4 ±6.4 (1.18)
Hole 6	1630	-39.5 ±2.3 (2.85)	-34.2 ±2.2 (3.10)	-21.5 ±2.6 (2.79)



TABLE 3.  
COLD WORKED HOLES STANDARDS

Location	System	Circumferential Residual Stress, ksi (Peak Width, <sup>0</sup> )		
		.05" from Edge of Hole	.10" from Edge of Hole	.15" from Edge of Hole
Standard 7320-003 7075-T651 1/4" Hole				
Baseline	1630	-13.4 ±7.2 (3.28)		
Hole 0	1630	-14.9 ±7.2 (3.89)	-7.4 ±7.1 (3.79)	-10.7 ±7.7 (4.05)
Hole 1	1630	-32.2 ±6.7 (2.66)	-22.2 ±8.9 (2.90)	-14.3 ±7.8 (3.11)
Hole 2	1630	-32.0 ±7.5 (3.19)	-26.4 ±7.9 (3.08)	-22.4 ±6.9 (3.13)
Hole 3	1630	-46.6 ±7.9 (4.06)	-31.2 ±7.5 (3.75)	-17.1 ±8.8 (3.74)
Hole 4	1630	-43.2 ±5.7 (3.43)	-33.8 ±6.6 (3.12)	-15.6 ±6.1 (3.19)
Hole 5	1630	-43.3 ±5.8 (3.54)	-40.1 ±6.6 (3.20)	-13.0 ±5.5 (2.90)
Hole 6	1630	-51.6 ±4.0 (3.83)	-33.1 ±5.0 (3.24)	-22.0 ±6.1 (3.15)

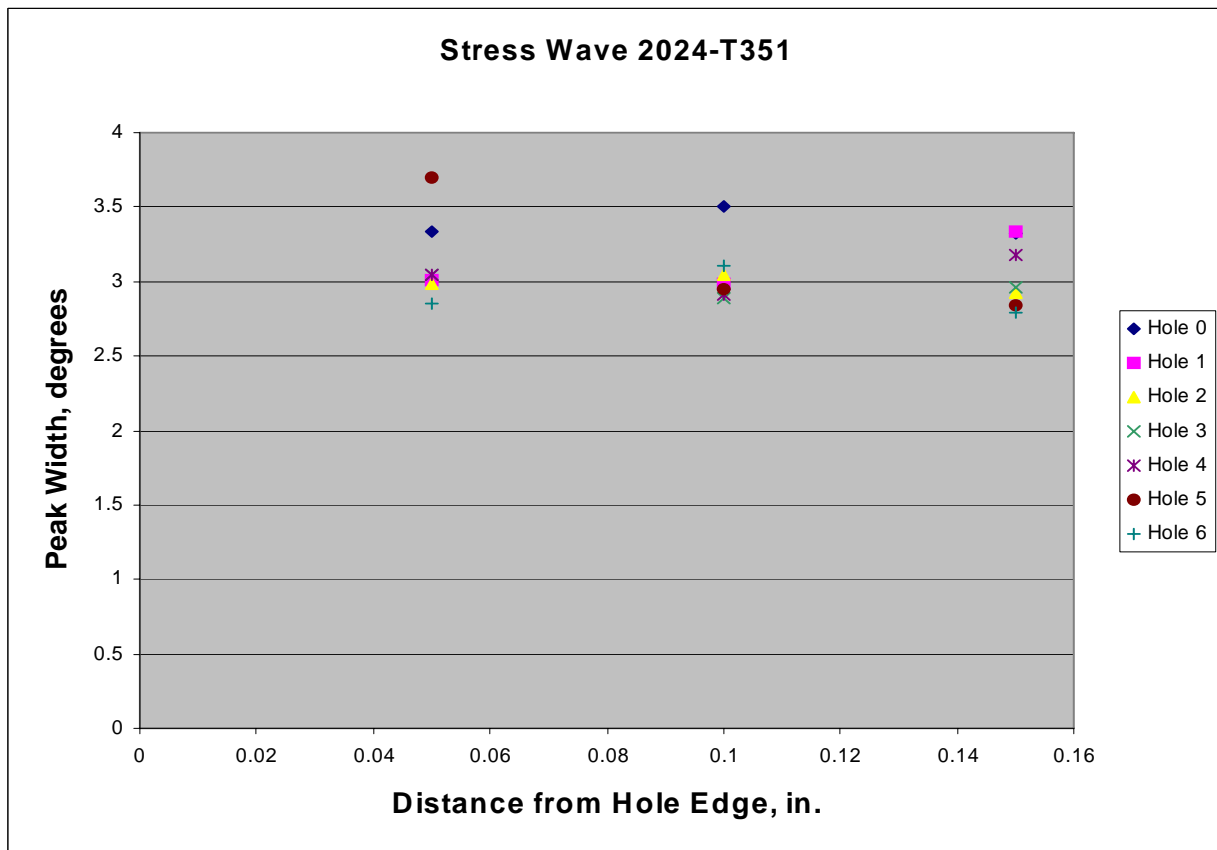
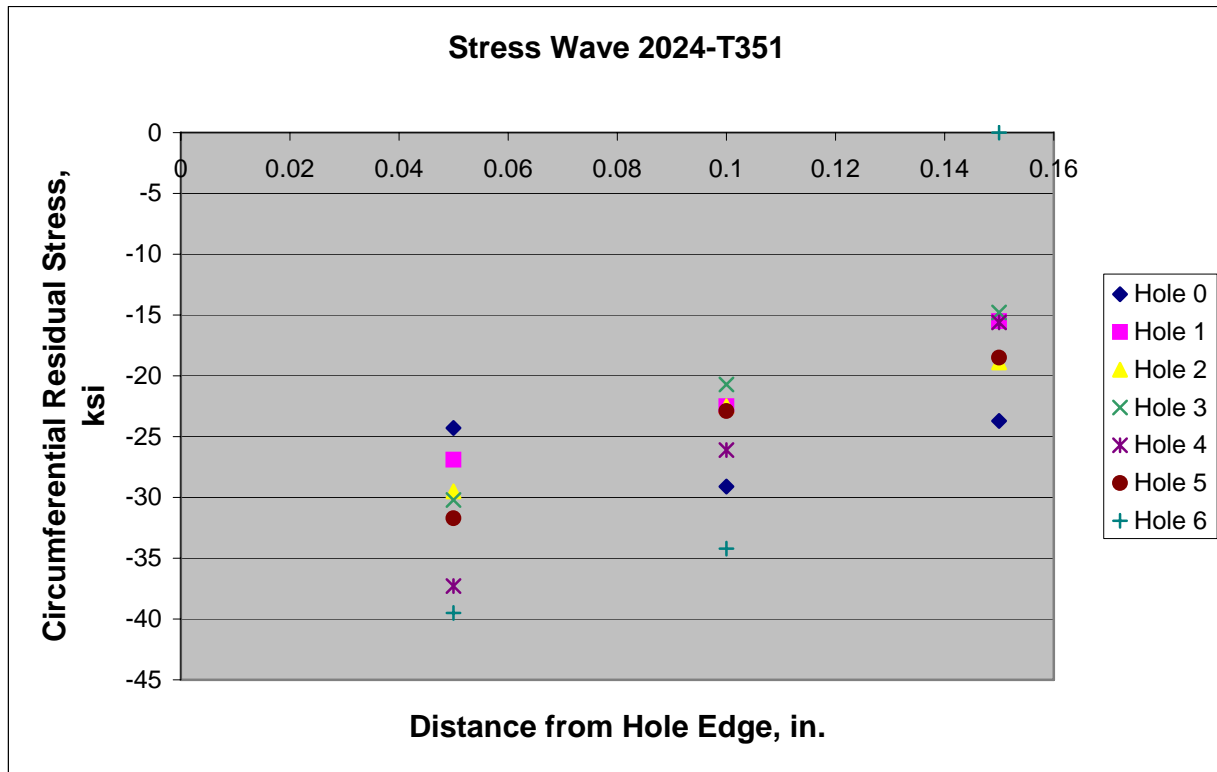


Figure 1. Stress Wave 2024-T351 Standard

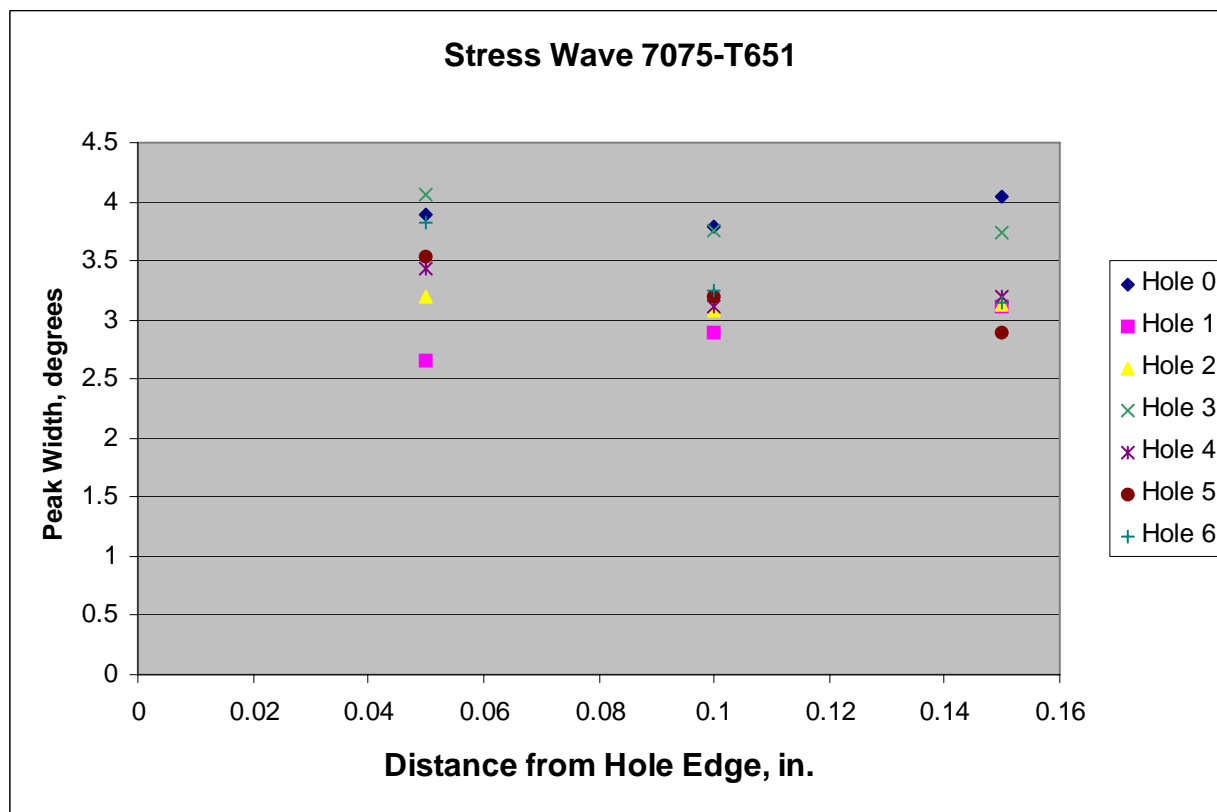
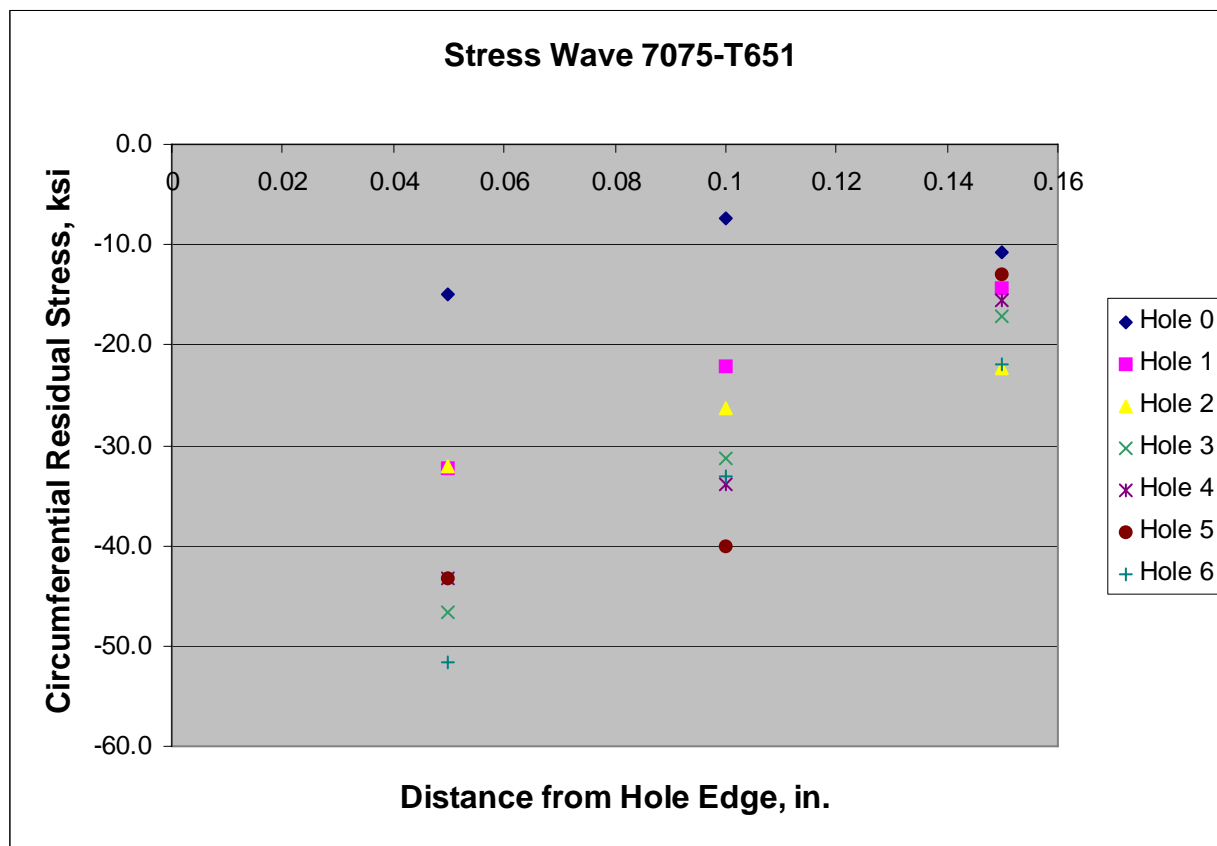


Figure 2. Stress Wave 7075-T651 Standard

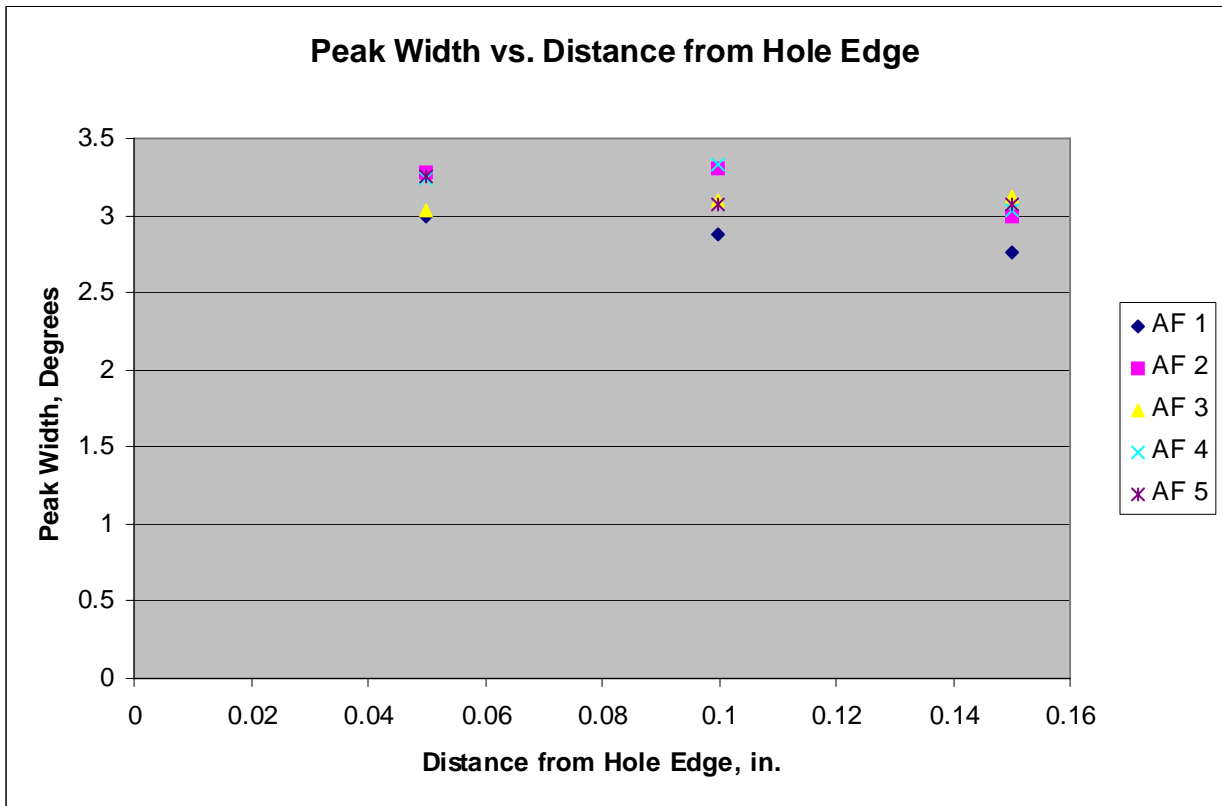
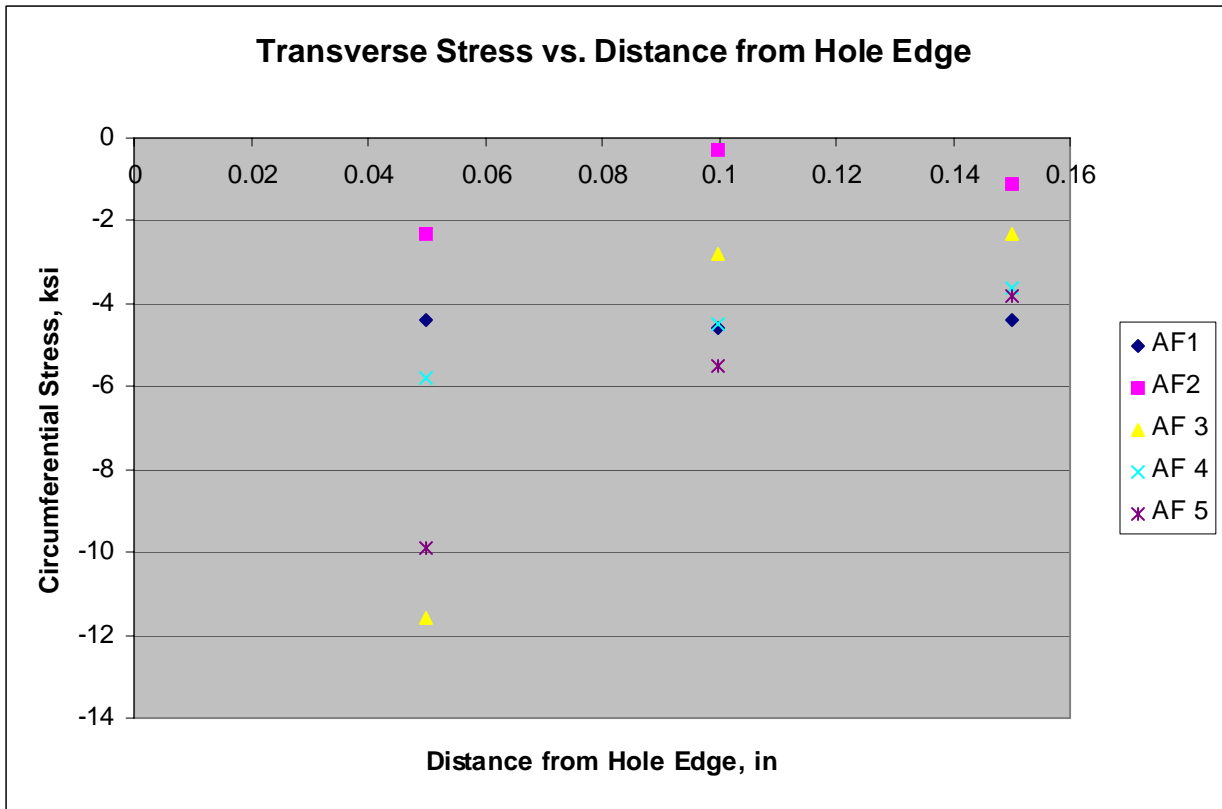


Figure 3. AF Standards Measured in the Transverse Direction

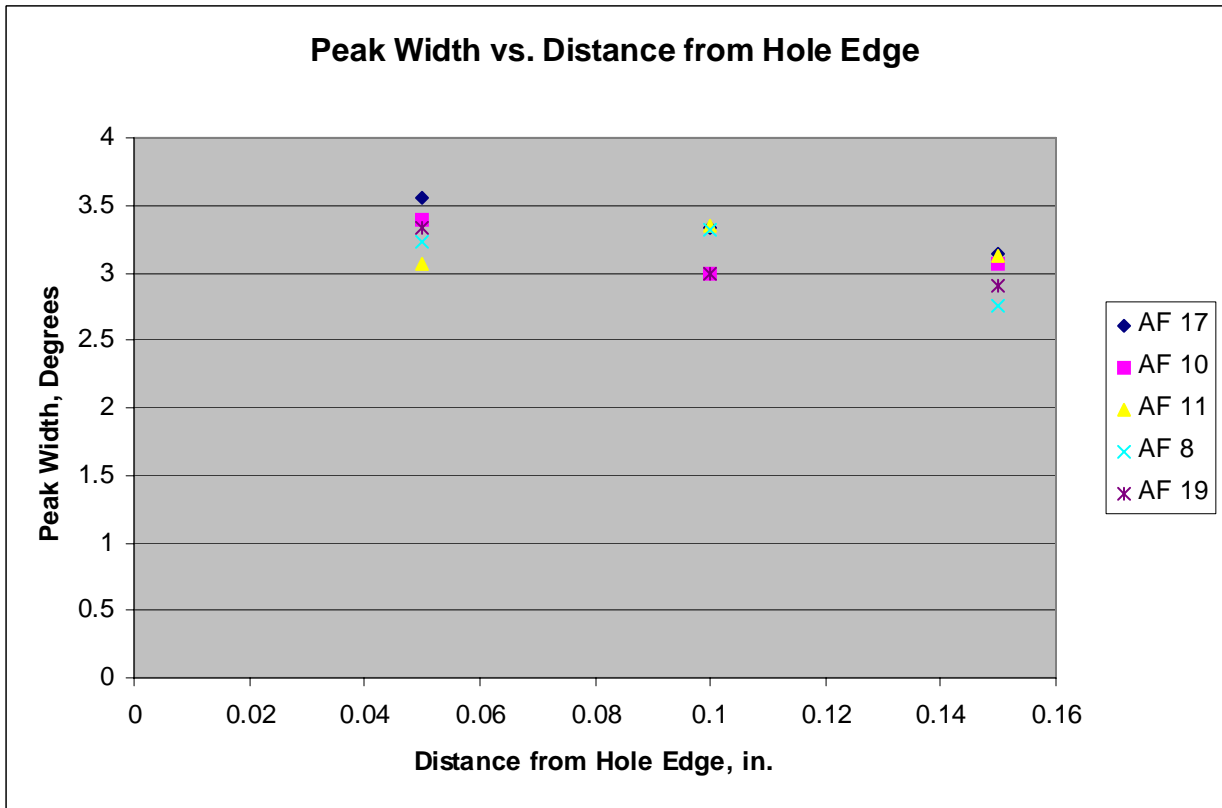
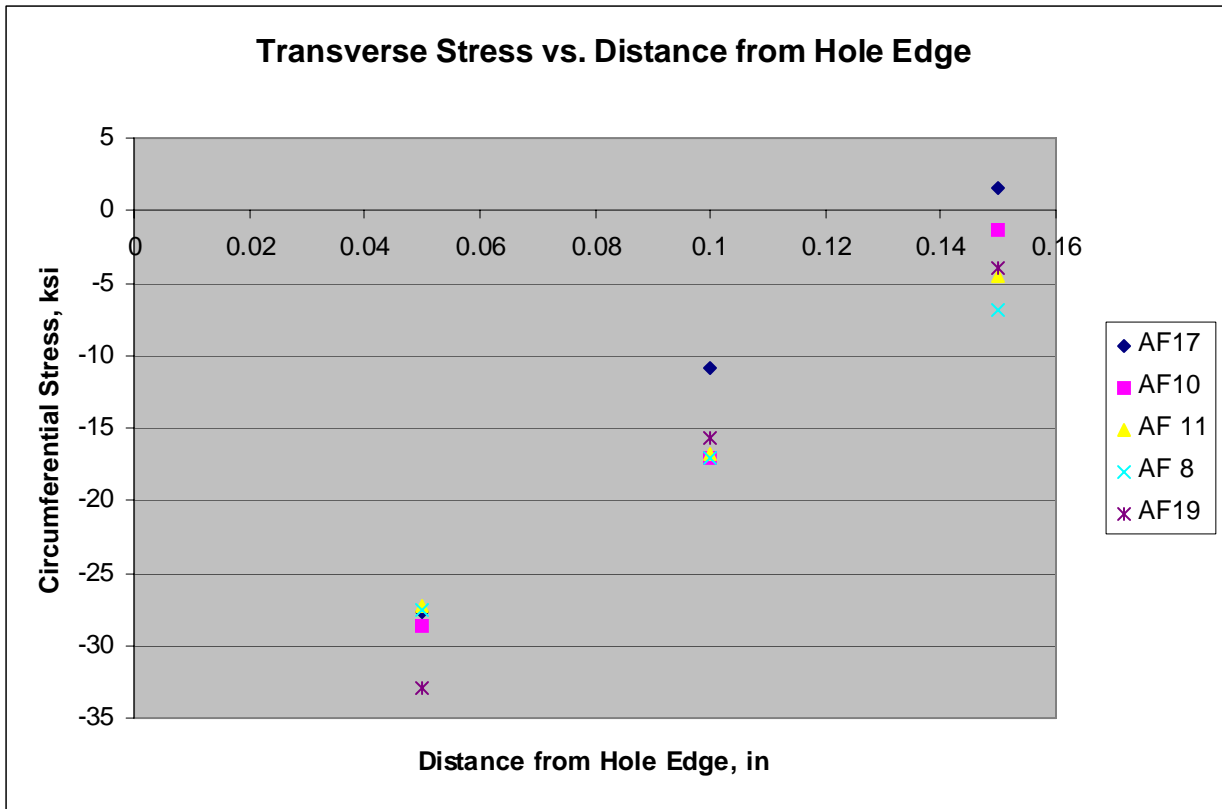


Figure 4. AF Standards Measured in the Transverse Direction

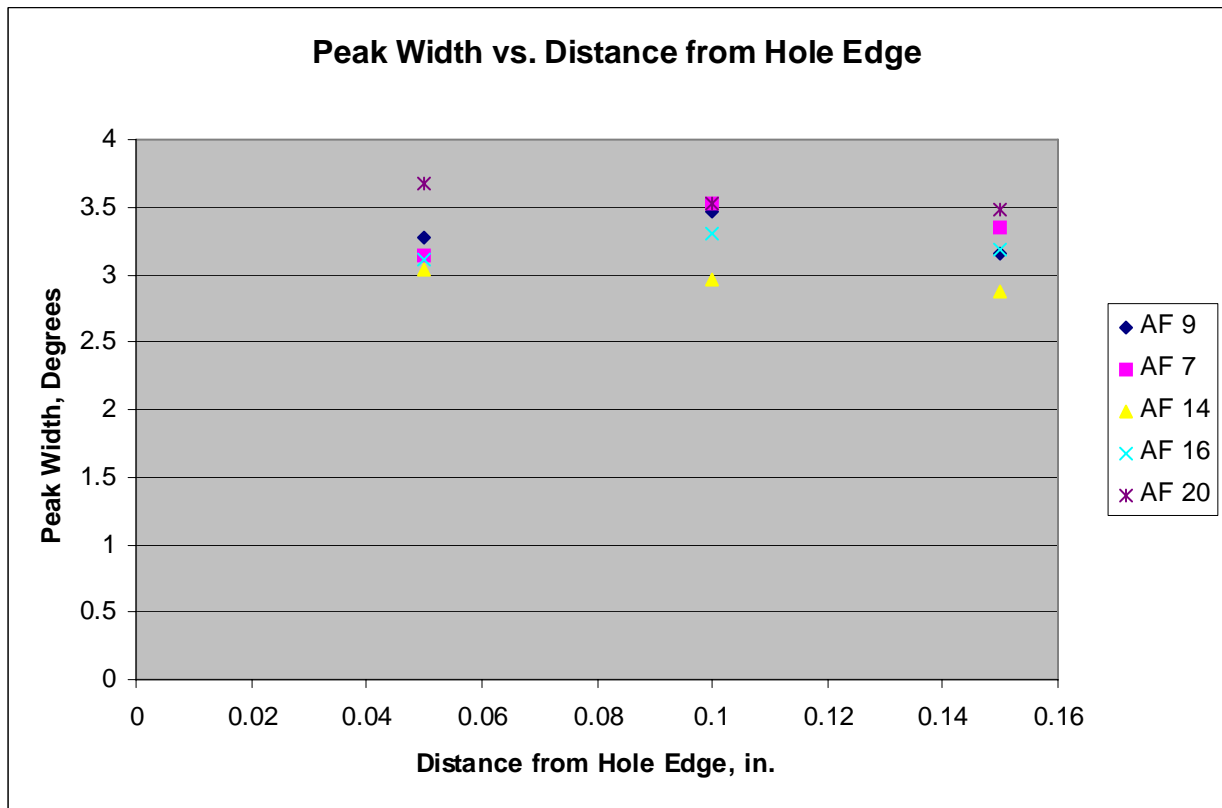
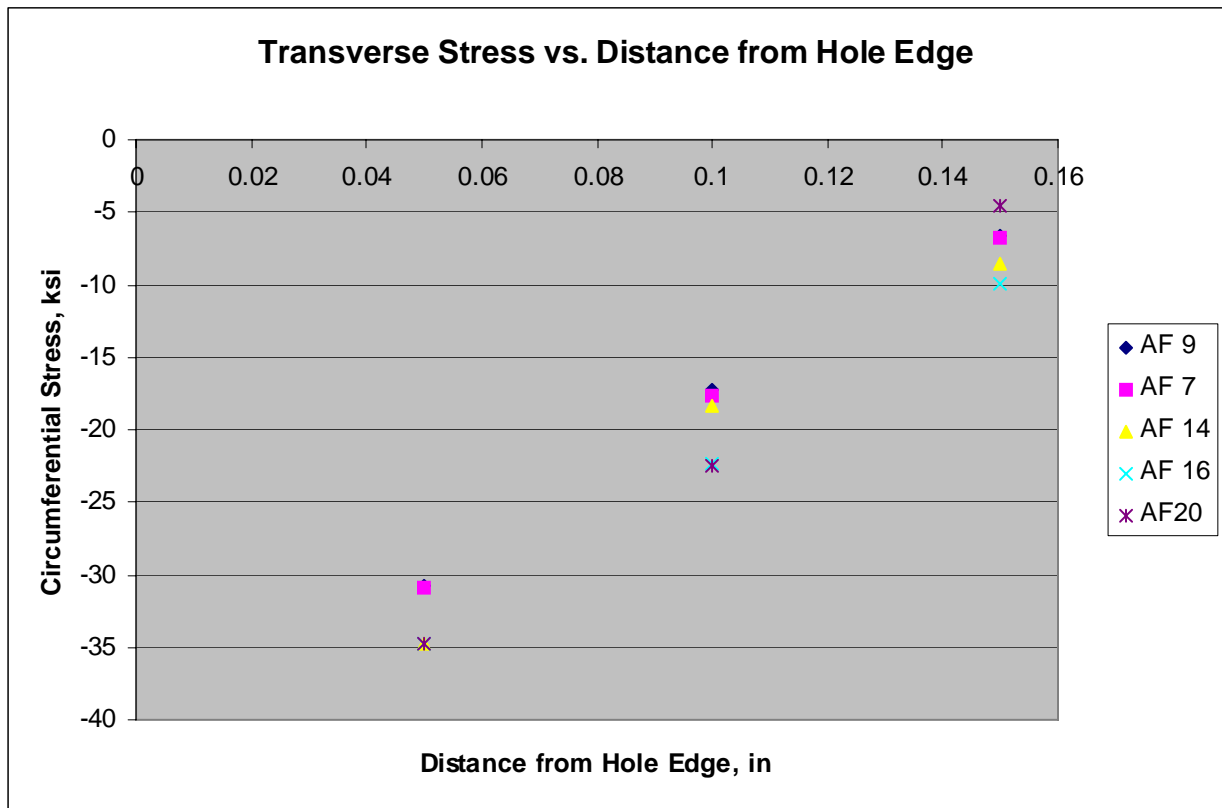


Figure 5. AF Standards Measured in the Transverse Direction

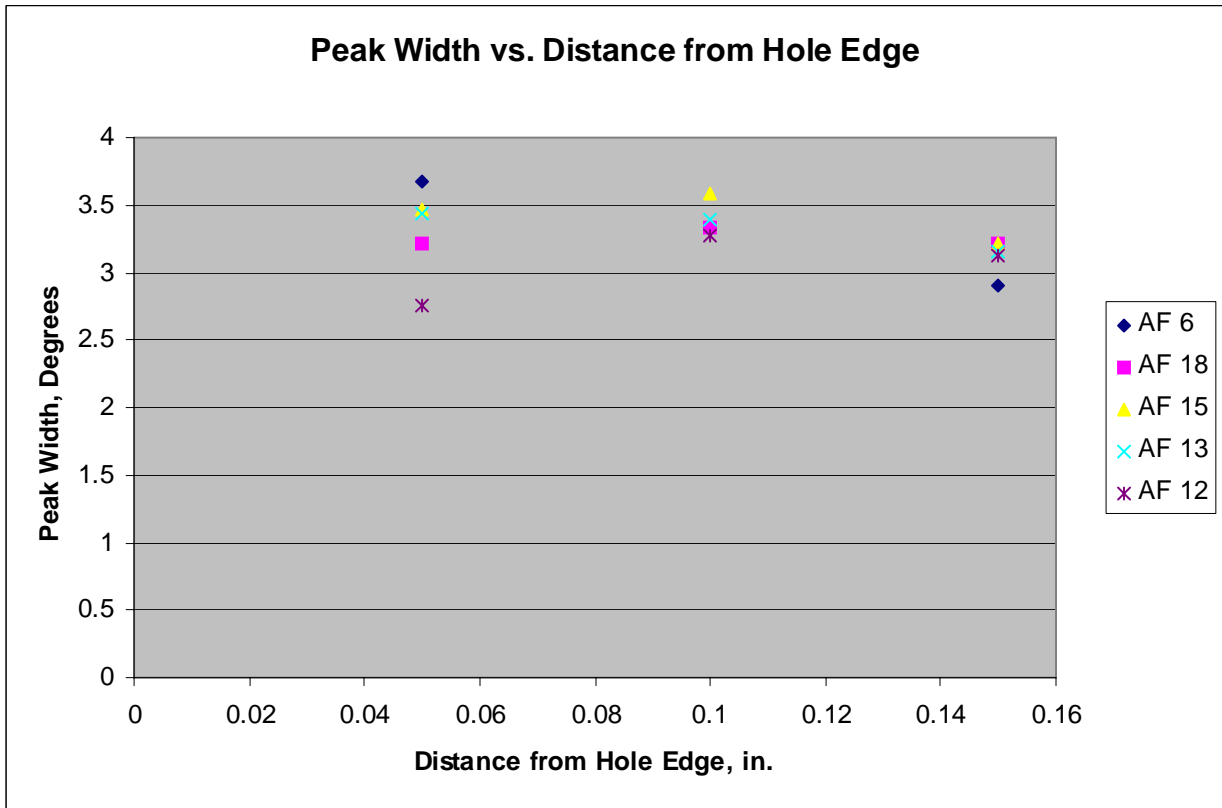
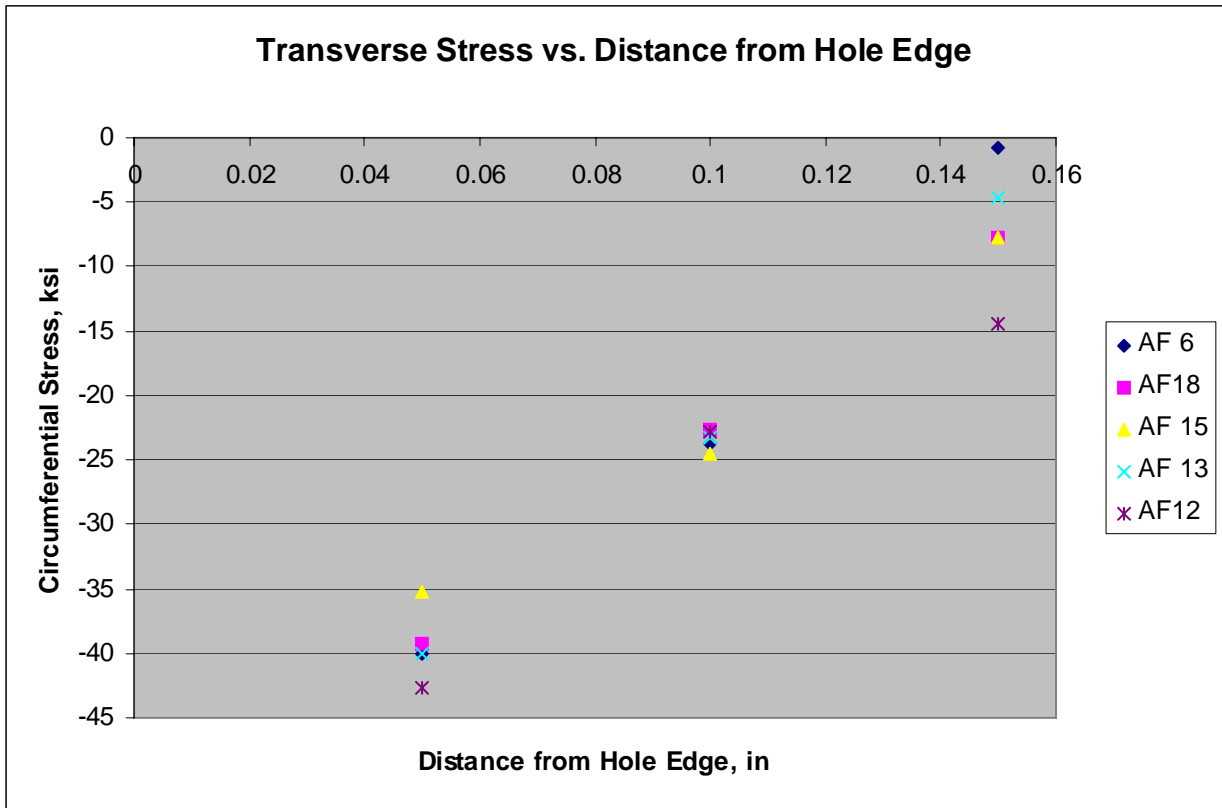


Figure 6. AF Standards Measured in the Transverse Direction

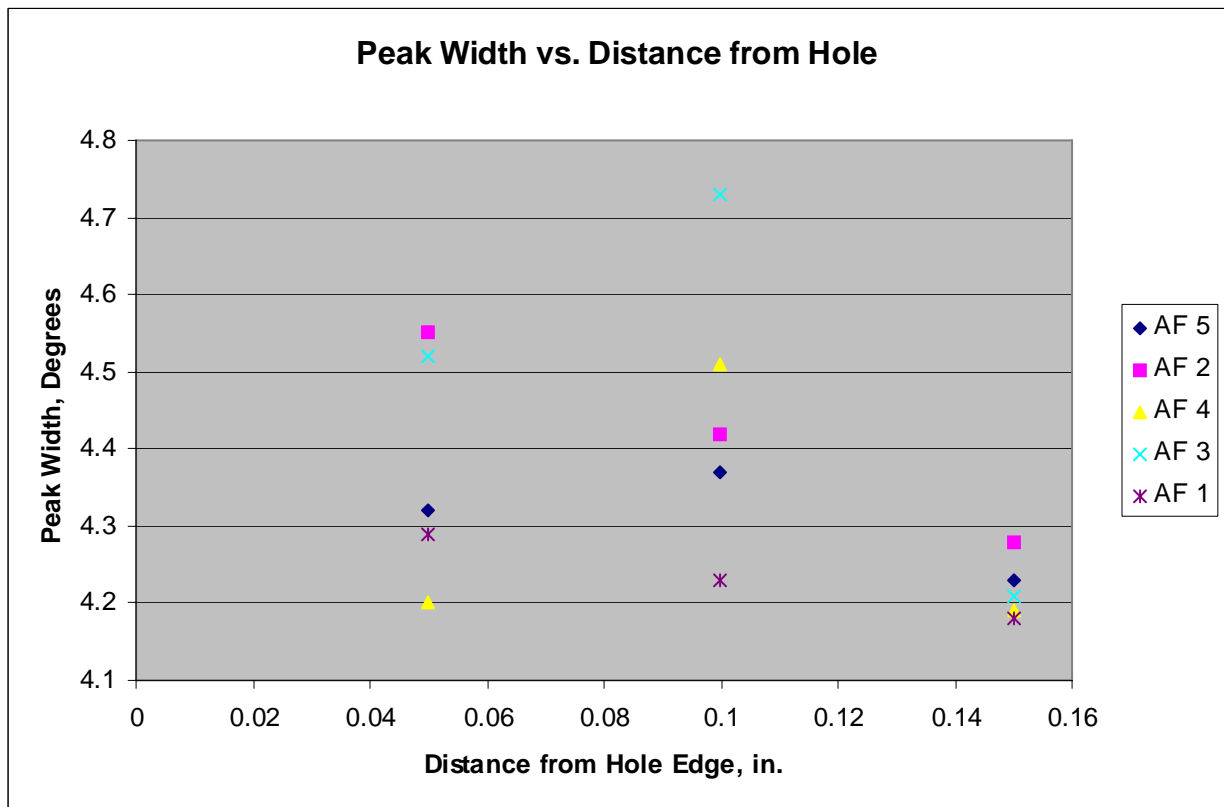
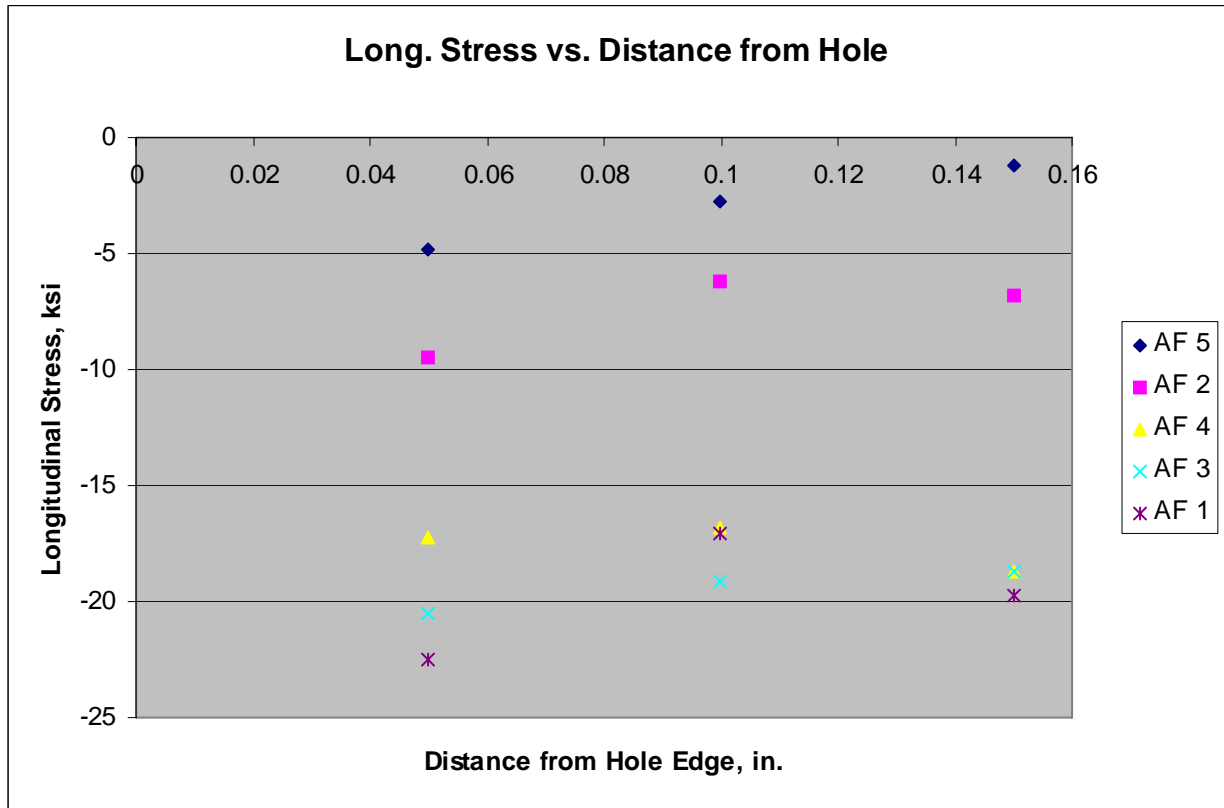


Figure 7. AF Standards Measured in the Longitudinal Direction



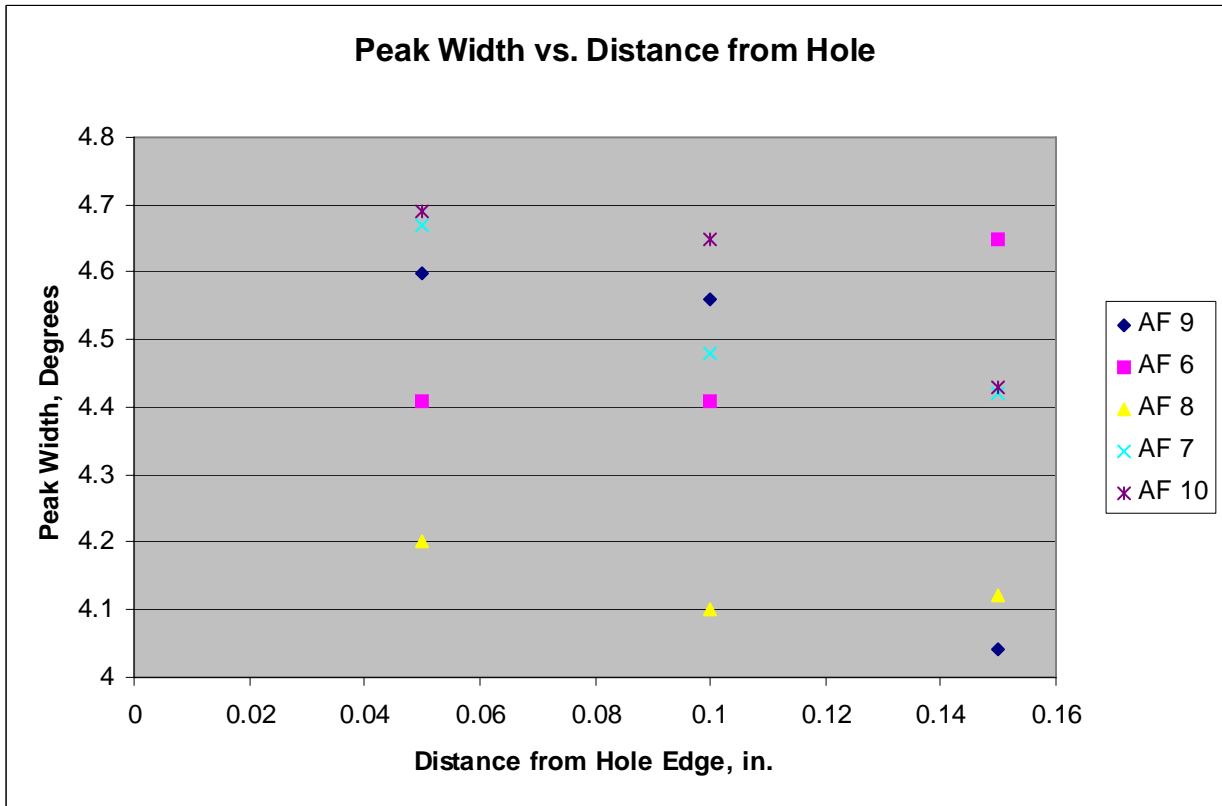
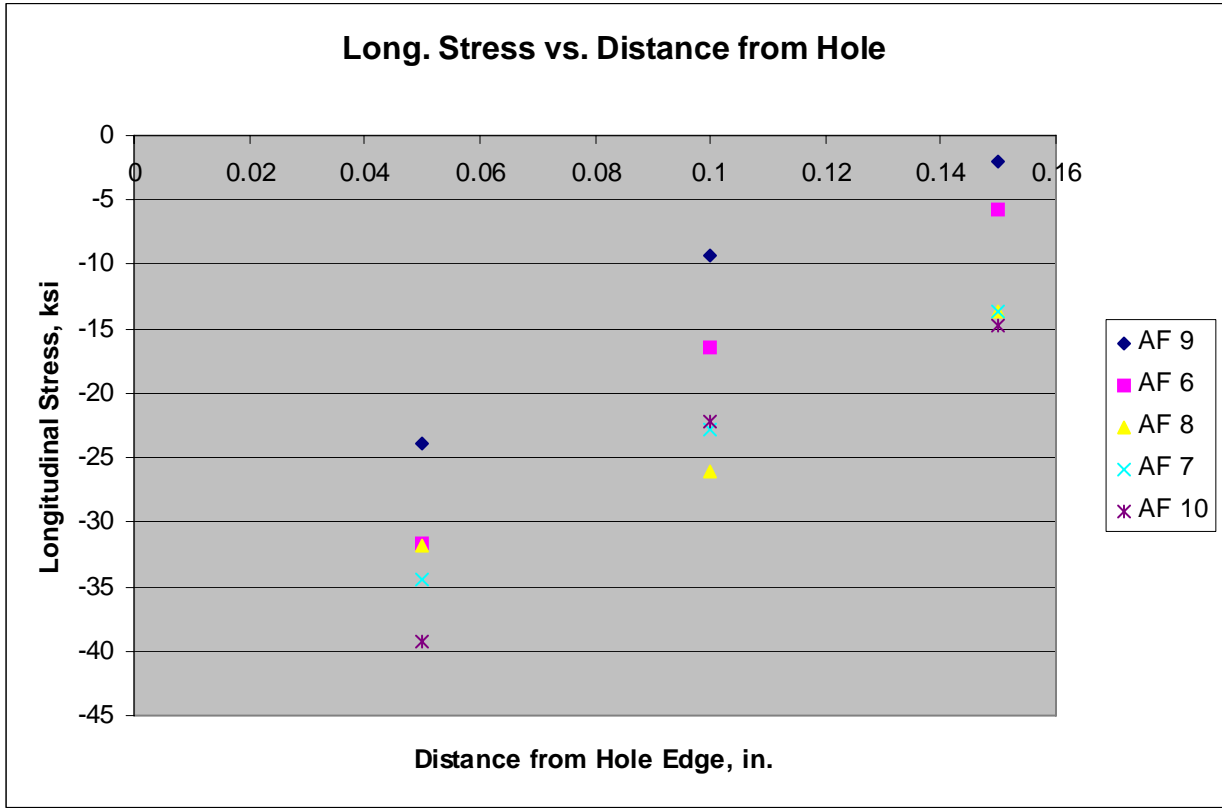


Figure 8. AF Standards Measured in the Longitudinal Direction

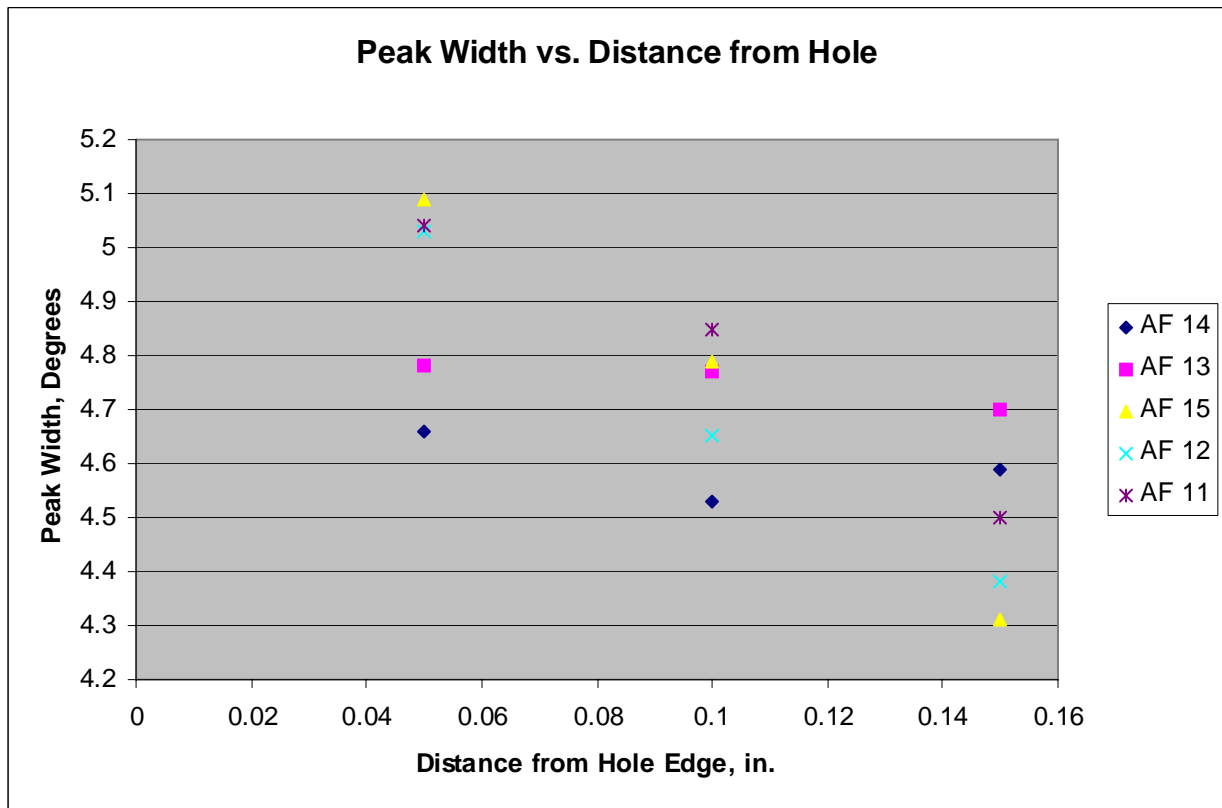
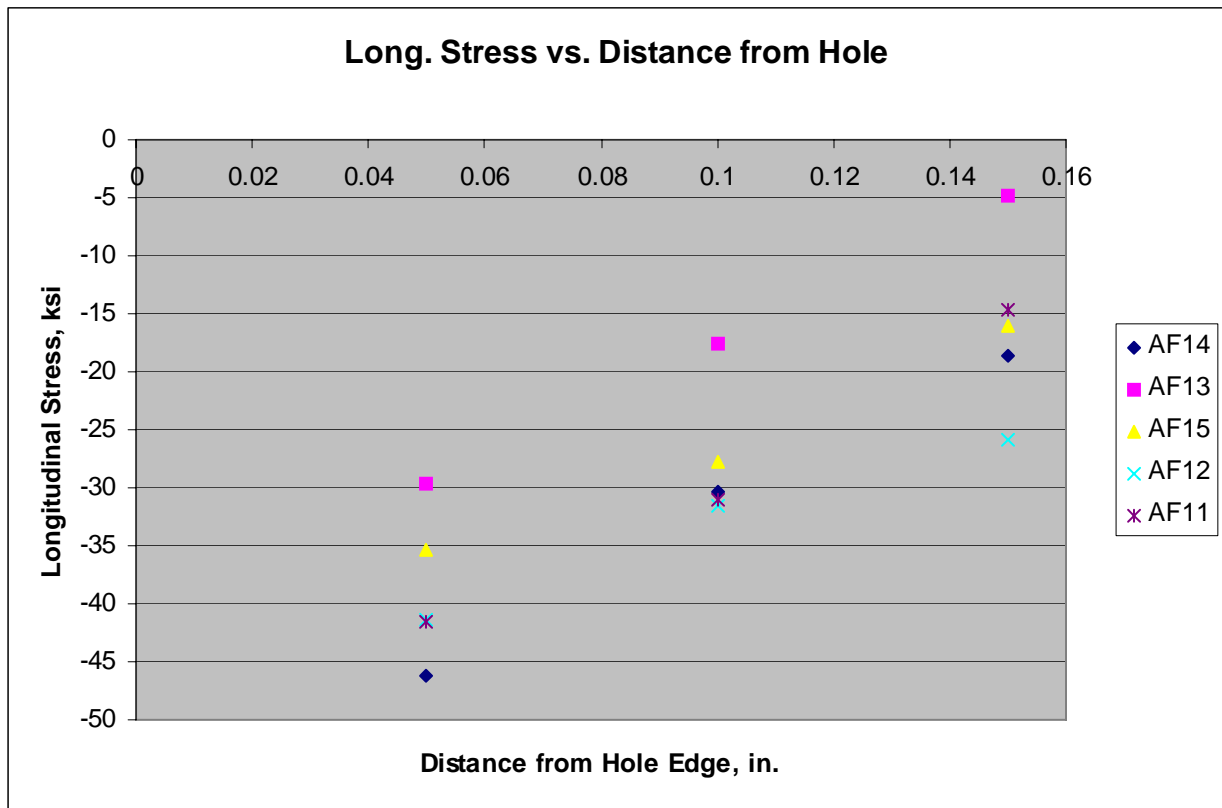


Figure 9. AF Standards Measured in the Longitudinal Direction

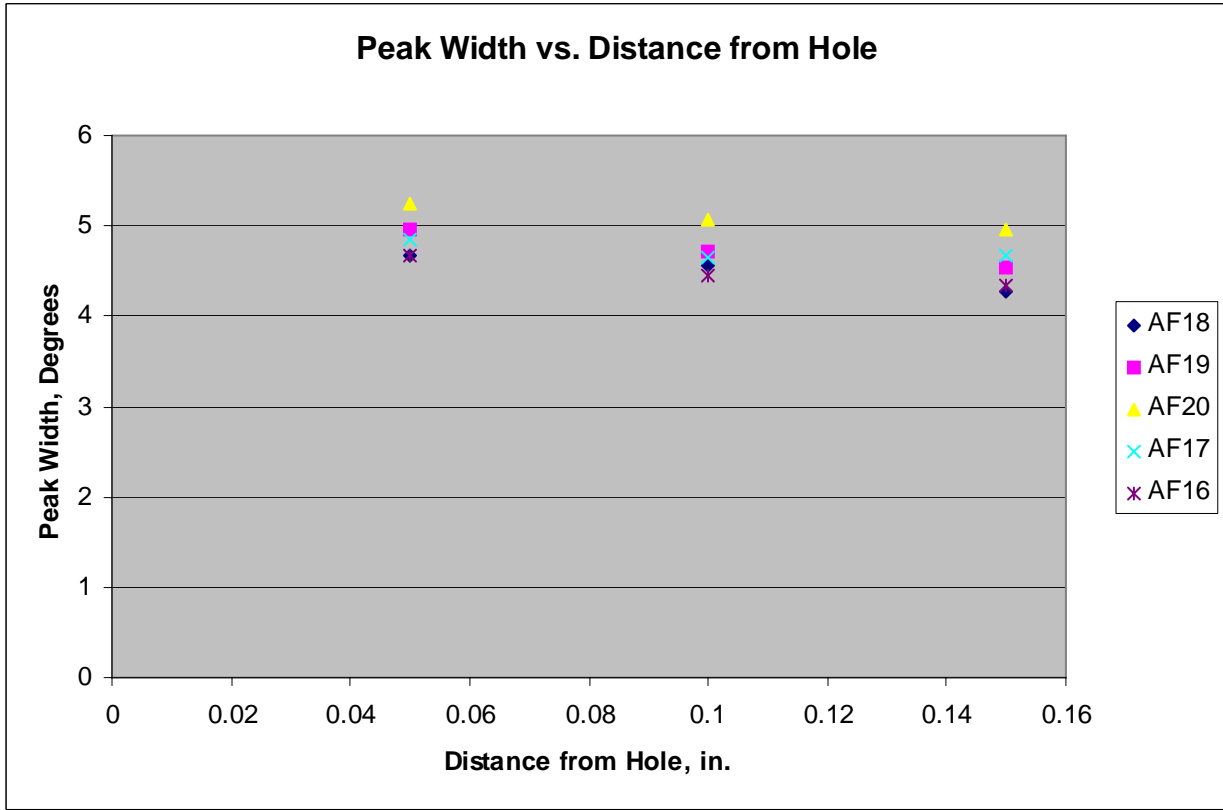
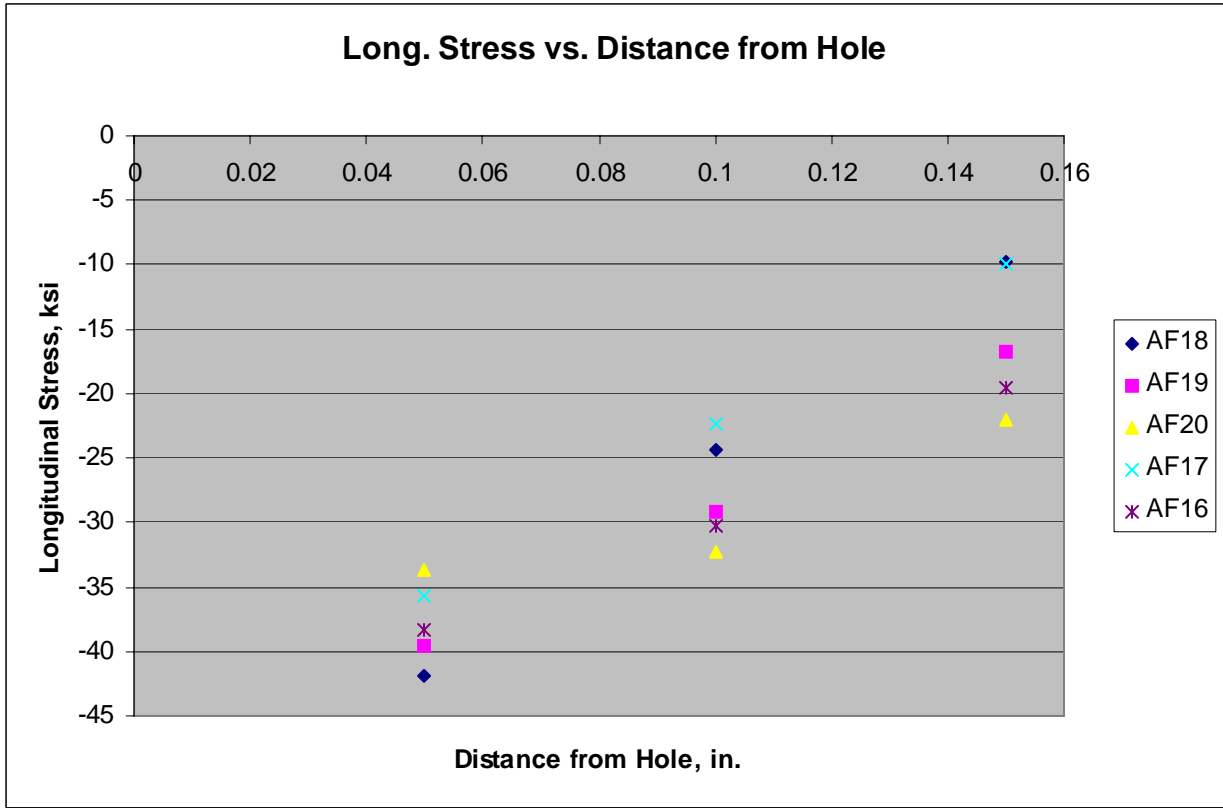


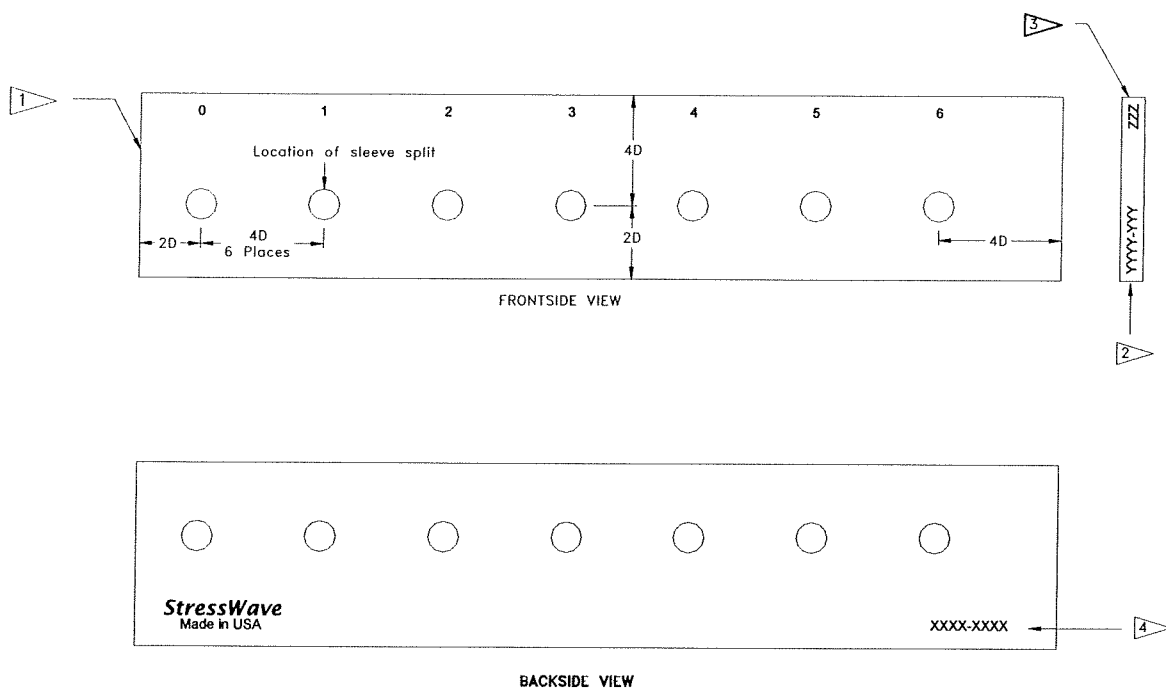
Figure 10. AF Standards Measured in the Longitudinal Direction

**APPENDIX A**  
**STRESS WAVE DOCUMENTATION**

## HOLE STANDARD

## Split Sleeve Cold Working

- Best machining practice was used to create relatively stress-free surfaces.
- Material and fastener certifications on file at StressWave, Inc.
- Standard Marking (D = nominal hole size)



- 1 = Standard Blank Number (manufacturing purposes only)  
2 = Standard Model Number  
3 = Serial Number  
4 = Material Type

- Split sleeve cold working performed with nosecap against front side of standard.
- Hole #6 is maximum possible applied expansion – the smallest starting hole was used that mandrel major diameter, or mandrel minor diameter plus twice the sleeve thickness, will pass through.


StressWave®		HOLE STANDARD					
Split Sleeve Cold Worked - 1/4 inch Straight Holes – 7075							
Standard Number	7320-003		Serial Number			001	
Material	7075-T651 per AMS QQ-A-250/12				Thickness		0.25
Grain Direction	Length	L	Width	LT	Thickness		ST
Cold Working Tooling	STDN 6-3-N						
SW Control Numbers	Material	1002		Fastener		1077	

### HOLE PREPARATION INFORMATION

Hole Number	0	1	2	3	4	5	6
<b>Starting Hole Dia.</b>	0.2475	0.2322	0.2304	0.2281	0.2256	0.2235	0.2231
<b>Mandrel Diameter</b>	N/A	0.2230	0.2230	0.2230	0.2230	0.2230	0.2230
<b>Sleeve Thickness</b>	N/A	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060
<b>Applied Expansion, %</b>	N/A	1.21	2.00	3.02	4.17	5.15	5.33
<b>Cold Worked Hole Dia.</b>	N/A	0.2331	0.2319	0.2311	0.2309	0.2308	0.2304
<b>Retained Exp. Ratio</b>	N/A	0.32	0.33	0.43	0.56	0.63	0.61
<b>Final Hole Dia.</b>	0.2477	0.2474	0.2477	0.2475	0.2478	0.2475	0.2476

NOTES: All dimensions in inches unless noted  
Other information on back

**CERTIFIED BY:**

  
Eric T. Easterbrook  
Vice President/Technology

**DATE:**

8/24/2004

StressWave®		HOLE STANDARD					
Split Sleeve Cold Worked - 1/4 inch Straight Holes – 2024							
Standard Number	7320-001		Serial Number			001	
Material	2024-T351 per AMS QQ-A-250/4				Thickness		0.25
Grain Direction	Length	L	Width	LT	Thickness	ST	
Cold Working Tooling	STDN 6-3-N						
SW Control Numbers	Material	1002		Fastener	1077		

### HOLE PREPARATION INFORMATION

Hole Number	0	1	2	3	4	5	6
<b>Starting Hole Dia.</b>	0.2479	0.2324	0.2302	0.2282	0.2257	0.2237	0.2230
<b>Mandrel Diameter</b>	N/A	.2230	.2230	.2230	.2230	.2230	.2230
<b>Sleeve Thickness</b>	N/A	.006	.006	.006	.006	.006	.006
<b>Applied Expansion, %</b>	N/A	1.12	2.09	2.98	4.12	5.05	5.38
<b>Cold Worked Hole Dia.</b>	N/A	0.2333	0.2328	0.2326	0.2319	0.2316	0.2317
<b>Retained Exp. Ratio</b>	N/A	0.35	0.54	0.65	0.67	0.70	0.72
<b>Final Hole Dia.</b>	0.2479	0.2476	0.2475	0.2475	0.2475	0.2480	0.2476

NOTES: All dimensions in inches unless noted  
Other information on back

**CERTIFIED BY:**



Eric T. Easterbrook  
Vice President/Technology

**DATE:**

8/24/2004

**APPENDIX B**  
**1630 VERIFICATION MEASUREMENTS**



===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: A:\1005-244\SBIR\45944\9579.STR  
Sample Description:  
SBIR Project / 2024-T3 Al Panel  
At Location Marked / Direction: Parallel with the Grain

Acquisition date & time: 1/16/2002 5:49pm

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_5mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 45.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.00  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A -3.34839E-07 B 0.00013162 C 0.0478522 D 148.3499

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp Cor	A	2-Theta	D Spacing	St. Dev.
0.0	0.00046	171.21	1186.1	2.91	0.27151		162.45	0.779405	0.000019
3.0	0.00106	168.38	1229.7	2.77	0.26634		162.27	0.779590	0.000019
6.0	0.00693	171.24	1209.9	2.92	0.27165		162.45	0.779403	0.000021
9.0	0.01848	169.98	1332.8	2.88	0.26986		162.37	0.779486	0.000018
12.0	0.03510	170.45	1416.2	2.82	0.26891		162.40	0.779453	0.000018
15.0	0.05620	173.22	1184.2	3.01	0.27510		162.57	0.779276	0.000020
18.0	0.08396	168.94	1201.2	2.65	0.26286		162.31	0.779548	0.000020
21.0	0.11425	171.81	1214.1	2.83	0.27005		162.49	0.779364	0.000019
24.0	0.15059	169.31	1210.9	2.77	0.26677		162.33	0.779527	0.000019
27.0	0.18962	169.88	1403.3	2.68	0.26432		162.37	0.779487	0.000012
30.0	0.23220	170.06	1558.5	2.64	0.26313		162.38	0.779473	0.000013
33.0	0.27684	172.09	1685.5	2.75	0.26809		162.51	0.779343	0.000011
36.0	0.32521	171.34	1612.9	2.73	0.26715		162.46	0.779392	0.000015
39.0	0.37374	174.03	1346.8	2.87	0.27262		162.63	0.779219	0.000014
42.0	0.42574	172.71	992.2	2.97	0.27389		162.54	0.779308	0.000022
45.0	0.47759	173.13	876.5	2.92	0.27304		162.57	0.779279	0.000019

Fitted Delta D vs Sin^2(psi) Data:

D Spacing Intercept.....: 0.779477  
Slope of Fitted Line.....: -0.0003892  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -4.0 KSI -27.4 MPa

Counting Statistics Stress Error (+/-): 0.3 KSI 2.1 MPa  
Probable error.....(+/-): 1.5 KSI 10.1 MPa

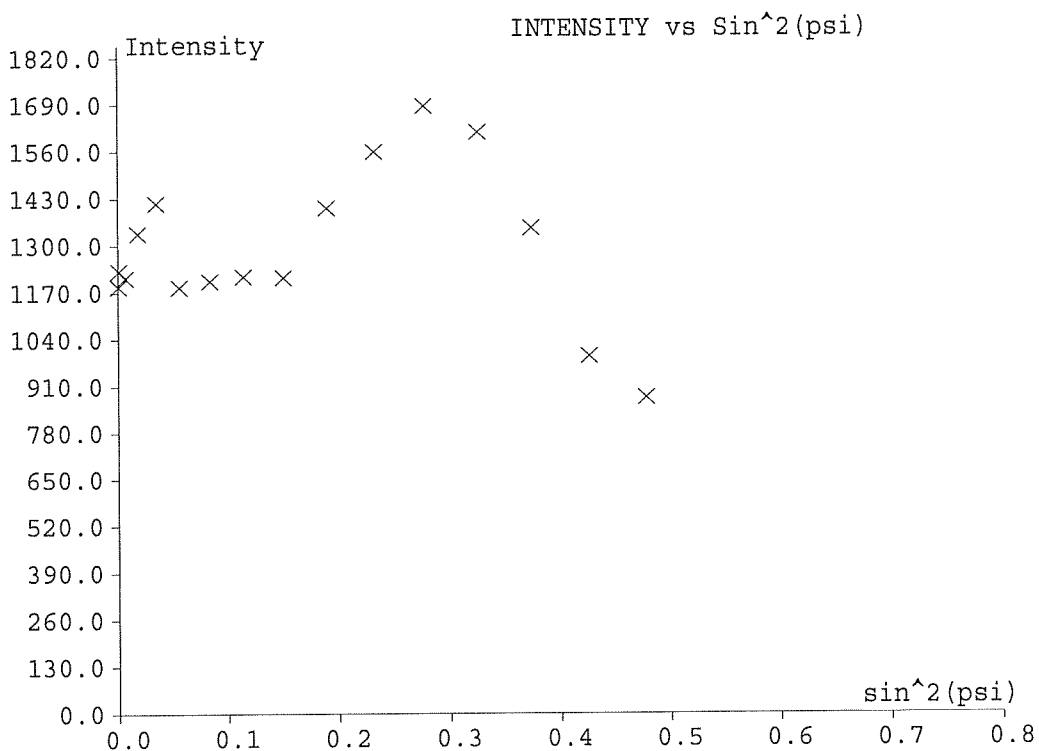
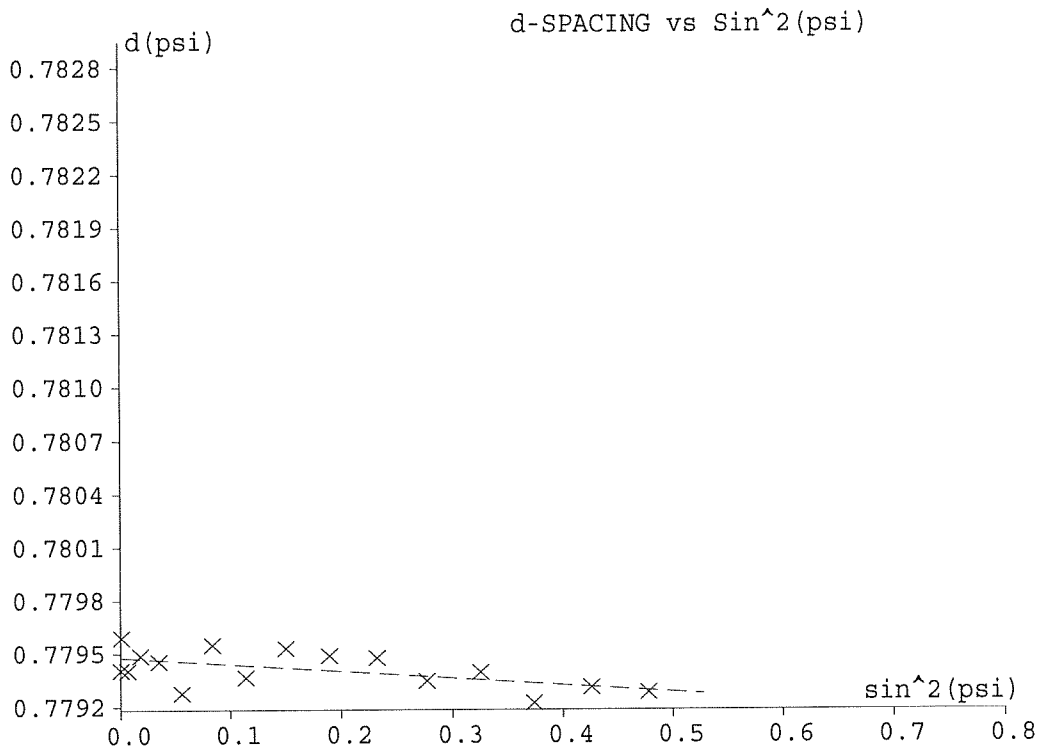
File: A:\1005-244\SBIR\45944\9579.STR

Sample Description:

SBIR Project / 2024-T3 Al Panel

At Location Marked / Direction: Parallel with the Grain

*Residual Stress.....	-4.0 KSI	-27.4 MPa
Counting Statistics Stress Error (+/-):	0.3 KSI	2.1 MPa
Probable error.....(+/-):	1.5 KSI	10.1 MPa



===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: A:\1005-244\SBIR\45944\9581.STR  
Sample Description:  
SBIR Project / 6061 T6 Al Panel  
At Location Marked / Direction: Parallel with the Grain

Acquisition date & time: 1/17/2002 10:31am

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_5mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 45.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.00  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A -3.34839E-07 B 0.00013162 C 0.0478522 D 148.3499

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp Cor	A	2-Theta	D Spacing	St. Dev.
0.0	0.00038	164.20	1592.3	1.26	0.02723		162.25	0.779619	0.000007
3.0	0.00118	164.82	1129.2	2.44	0.25241		162.06	0.779818	0.000008
6.0	0.00724	164.13	1592.7	1.28	0.02974		162.24	0.779626	0.000007
9.0	0.01872	164.78	1746.8	1.35	0.03831		162.27	0.779591	0.000007
12.0	0.03570	163.68	2157.3	1.19	0.02299		162.22	0.779650	0.000005
15.0	0.05764	163.76	2081.1	1.27	0.02797		162.22	0.779650	0.000006
18.0	0.08454	163.36	1695.0	1.25	0.02555		162.19	0.779674	0.000007
21.0	0.11588	163.52	1750.4	1.31	0.03320		162.20	0.779672	0.000006
24.0	0.15168	162.75	1437.4	1.20	0.02319		162.16	0.779714	0.000007
27.0	0.19115	162.61	1364.4	1.21	0.02341		162.15	0.779724	0.000008
30.0	0.23372	163.13	1658.6	1.26	0.02666		162.18	0.779691	0.000007
33.0	0.27974	162.42	1612.8	1.20	0.02312		162.14	0.779736	0.000007
36.0	0.32791	162.32	1646.8	1.17	0.02211		162.13	0.779742	0.000006
39.0	0.37838	161.52	1327.9	1.23	0.02413		162.08	0.779799	0.000006
42.0	0.43036	160.35	1343.7	1.11	0.02011		162.01	0.779875	0.000007
45.0	0.48211	161.10	972.1	1.23	0.02393		162.05	0.779828	0.000009

Fitted Delta D vs Sin^2(psi) Data:

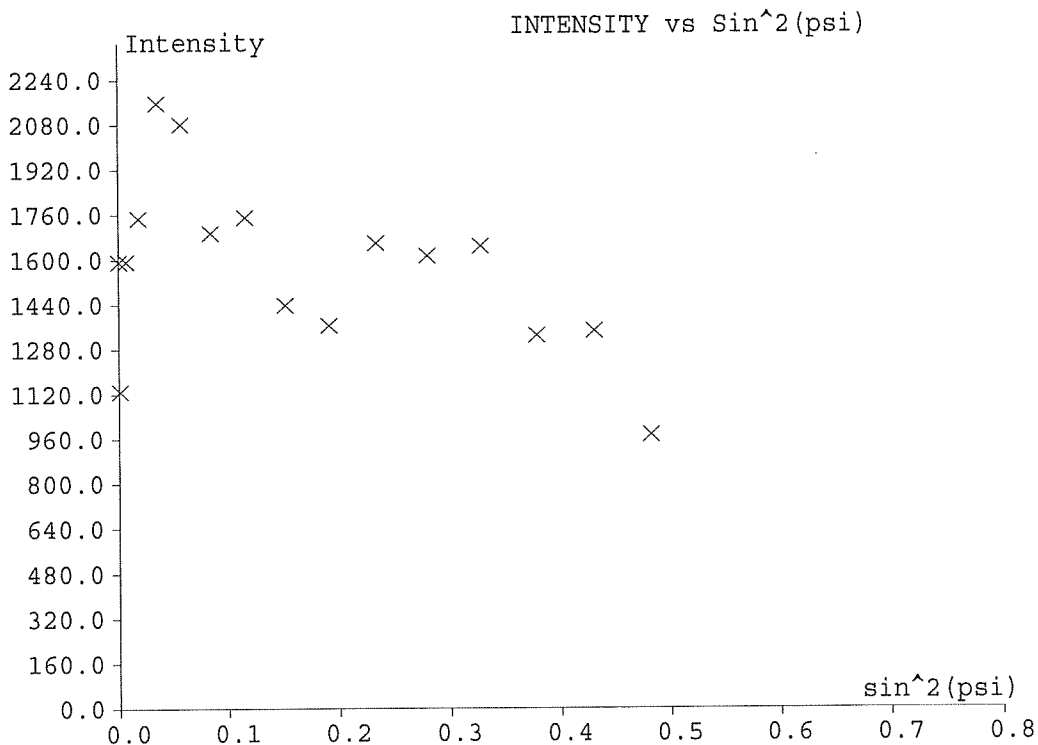
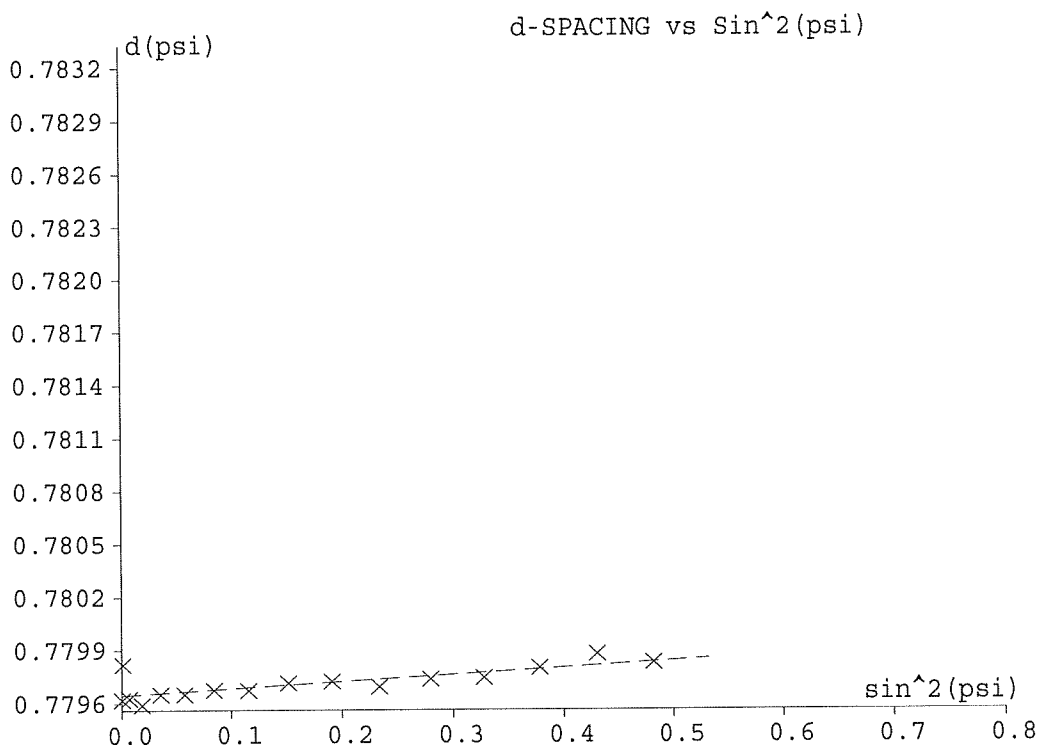
D Spacing Intercept.....: 0.779645  
Slope of Fitted Line.....: 0.0003869  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: 4.0 KSI 27.3 MPa

Counting Statistics Stress Error (+/-): 0.1 KSI 0.8 MPa  
Probable error.....(+/-): 0.9 KSI 6.2 MPa

File: A:\1005-244\SBIR\45944\9581.STR  
Sample Description:  
SBIR Project / 6061 T6 Al Panel  
At Location Marked / Direction: Parallel with the Grain

*Residual Stress.....:	4.0 KSI	27.3 MPa
Counting Statistics Stress Error (+/-):	0.1 KSI	0.8 MPa
Probable error.....(+/-):	0.9 KSI	6.2 MPa



===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: A:\1005-244\SBIR\45944\9580.STR  
Sample Description:  
SBIR Project / 7075 T6 Al Panel  
At Location Marked / Direction: Parallel with the Grain

Acquisition date & time: 1/17/2002 10:14am

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_5mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 45.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.00  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A -3.34839E-07 B 0.00013162 C 0.0478522 D 148.3499

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp Cor	A	2-Theta	D Spacing	St. Dev.
0.0	0.00009	149.26	1049.8	2.36	0.24112	161.07	0.780912	0.000013	
3.0	0.00189	148.34	1245.5	2.29	0.23807	161.01	0.780977	0.000011	
6.0	0.00907	149.30	1272.9	2.42	0.24312	161.07	0.780911	0.000013	
9.0	0.02174	148.81	1289.5	2.33	0.23999	161.04	0.780944	0.000013	
12.0	0.03950	149.22	1516.9	2.26	0.23668	161.07	0.780910	0.000011	
15.0	0.06175	151.60	1486.9	2.31	0.24053	161.22	0.780740	0.000010	
18.0	0.08887	152.99	1474.2	2.31	0.24096	161.31	0.780640	0.000009	
21.0	0.12082	153.23	1006.0	2.47	0.24723	161.32	0.780629	0.000013	
24.0	0.15637	154.54	1121.5	2.27	0.23956	161.41	0.780526	0.000011	
27.0	0.19647	153.79	1414.4	2.08	0.22698	161.38	0.780566	0.000009	
30.0	0.23905	155.35	1412.7	2.38	0.24512	161.46	0.780474	0.000010	
33.0	0.28447	156.32	1642.7	2.14	0.23252	161.54	0.780390	0.000009	
36.0	0.33184	158.38	1769.0	2.40	0.24749	161.65	0.780261	0.000009	
39.0	0.38144	159.42	1155.0	2.46	0.25030	161.72	0.780191	0.000010	
42.0	0.43327	158.69	853.3	2.49	0.25100	161.67	0.780243	0.000014	
45.0	0.48411	161.06	1094.7	2.45	0.25089	161.82	0.780076	0.000010	

Fitted Delta D vs Sin^2(psi) Data:

D Spacing Intercept.....: 0.780903  
Slope of Fitted Line.....: -0.001775  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -18.1 KSI -124.9 MPa

Counting Statistics Stress Error (+/-): 0.2 KSI 1.3 MPa  
Probable error.....(+/-): 1.1 KSI 7.5 MPa

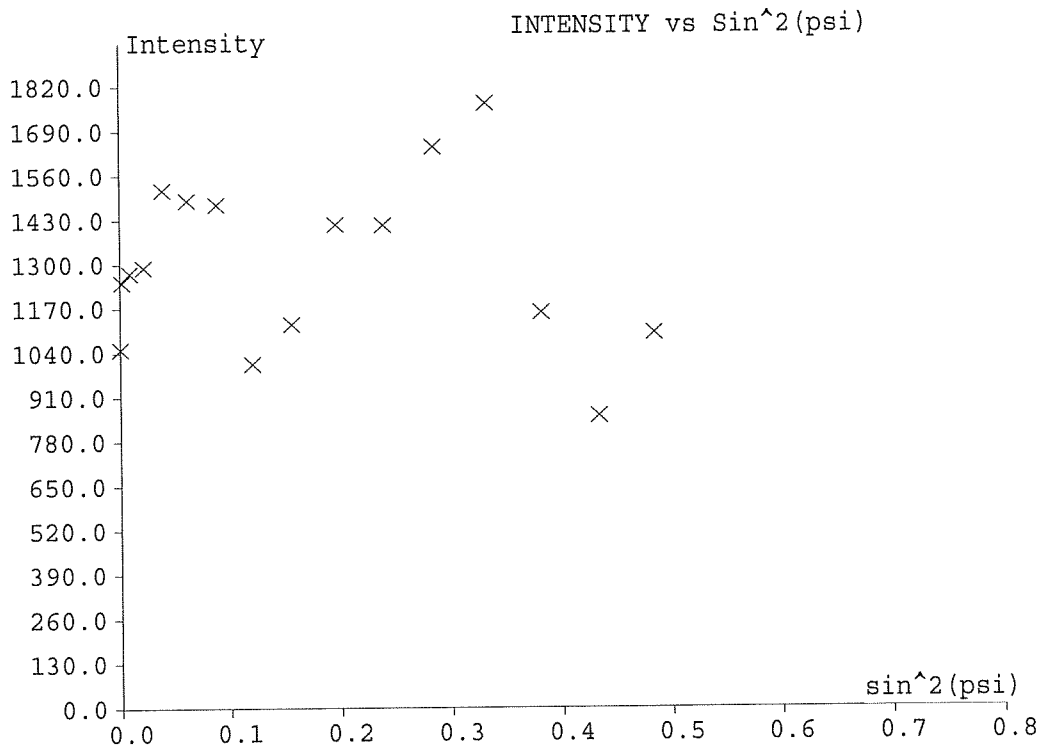
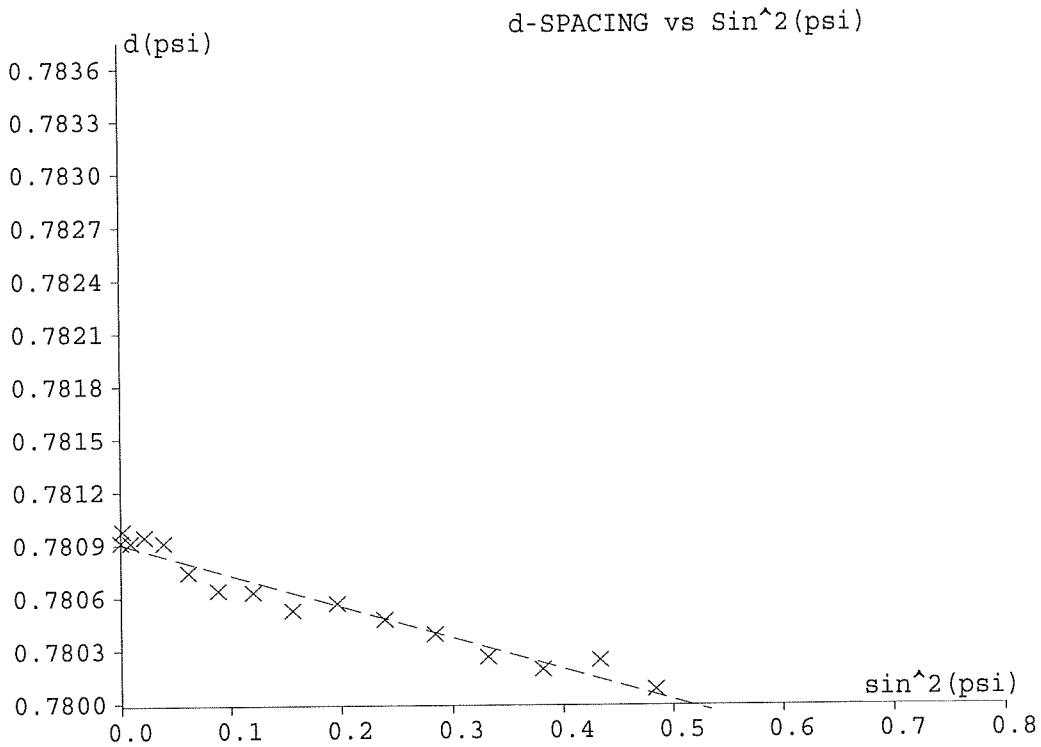
File: A:\1005-244\SBIR\45944\9580.STR

Sample Description:

SBIR Project / 7075 T6 Al Panel

At Location Marked / Direction: Parallel with the Grain

*Residual Stress.....:	-18.1 KSI	-124.9 MPa
Counting Statistics Stress Error (+/-):	0.2 KSI	1.3 MPa
Probable error.....(+/-):	1.1 KSI	7.5 MPa



===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\1005\2005\WRAFB\52838\19392.STR

Sample Description:

Stress Free Al Sample / S/N 01008

TEC P/N: 10-100-0475 / TEJ

Acquisition date & time: 8/23/2005 1:44pm

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 60.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 0.80  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A 1.42245E-08 B -5.2884E-06 C 0.0618978 D 148.0758

Psi	Sin <sup>2</sup> (psi)	Pk Chan	Intens	FWHM	Kalp	Cor A	2-Theta	D Spacing	St. Dev.
-45.0	0.52115	168.94	712.2	1.25	0.02628		162.42	0.779431	0.000008
-30.0	0.26849	168.86	720.9	1.26	0.02747		162.42	0.779437	0.000009
-15.0	0.07803	169.22	722.7	1.25	0.02630		162.44	0.779413	0.000010
0.0	0.00047	169.83	740.8	1.29	0.03003		162.47	0.779378	0.000010
15.0	0.05675	169.32	727.3	1.34	0.03590		162.44	0.779417	0.000010
30.0	0.23164	169.70	727.4	1.35	0.03642		162.46	0.779392	0.000009
45.0	0.47873	169.65	733.2	1.43	0.05575		162.44	0.779416	0.000009

Fitted Delta D vs Sin<sup>2</sup>(psi) Data:

D Spacing Intercept.....: 0.779399  
Slope of Fitted Line.....: 5.645E-05  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: 0.6 KSI 4.0 MPa

Counting Statistics Stress Error (+/-): 0.2 KSI 1.3 MPa  
Probable error.....(+/-): 0.4 KSI 2.6 MPa

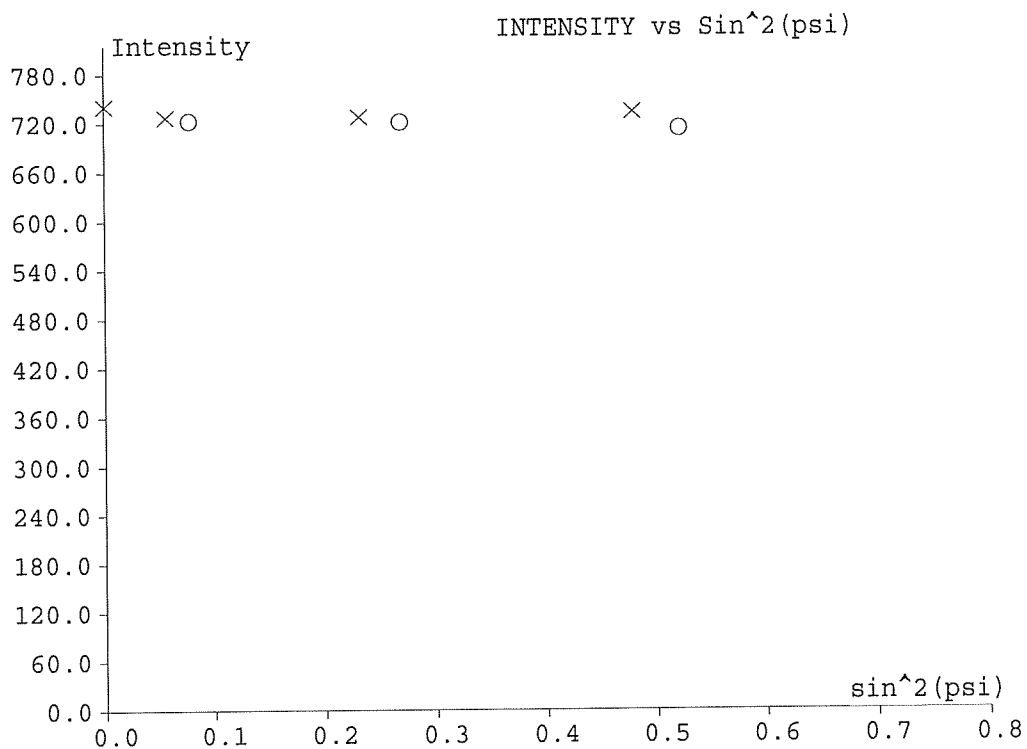
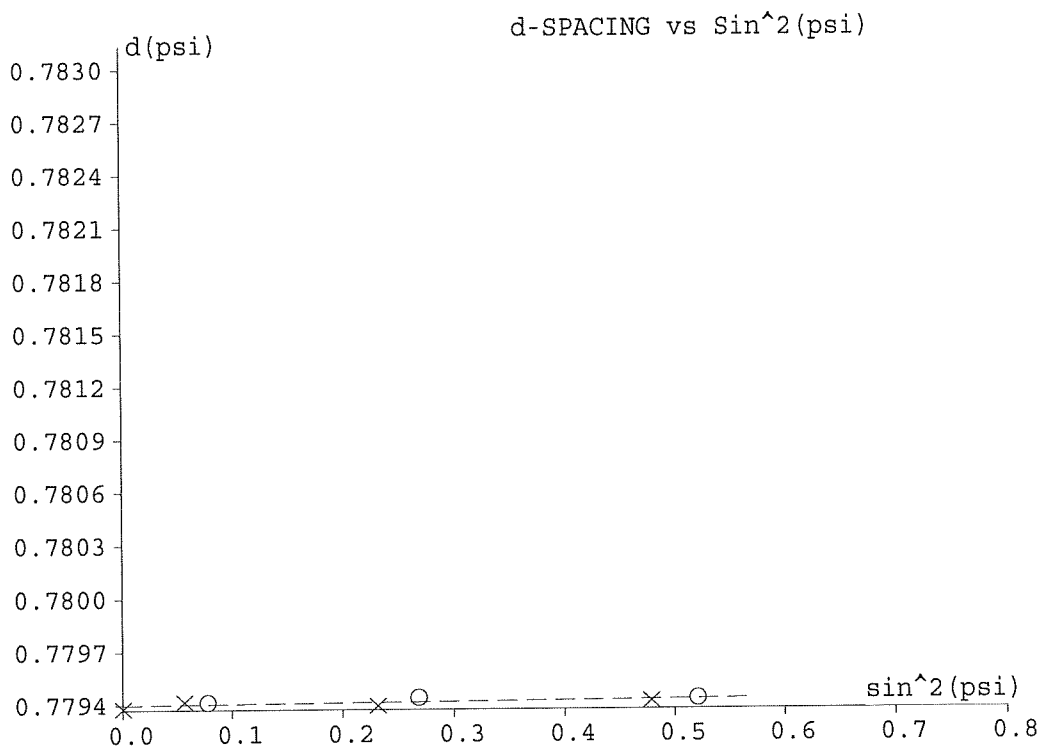
File: C:\STRESS\DATA\1005\2005\WRAFB\52838\19392.STR

Sample Description:

Stress Free Al Sample / S/N 01008

TEC P/N: 10-100-0475 / TEJ

*Residual Stress.....:	0.6 KSI	4.0 MPa
Counting Statistics Stress Error (+/-):	0.2 KSI	1.3 MPa
Probable error.....(+/-):	0.4 KSI	2.6 MPa





**APPENDIX C**  
**VEXTEC REPORT**

## Introduction

Since the 1940's the fatigue life of aerospace components has been improved by inducing a surface layer of compressive residual stress using surface treatment finishing. The compressive layer resists both crack initiation and crack propagation. The most commonly used methods of surface finishing develop a layer of compressive residual stress following mechanical tensile deformation. The methods differ primarily in how the surface is deformed and in the magnitude and form of the resulting residual stress and cold work (plastic deformation) distributions developed in the surface layers. For example, conventional air-blast shot peening is routinely applied to steel, titanium, and nickel alloy turbine engine components. High velocity impact of each particle of shot produces a dimple with a region of compression in the center. The magnitude of compression achieved depends primarily upon the mechanical properties of the alloy. The depth of the compressive layer and the degree of cold working depend upon the peening parameters including shot size, velocity, coverage, impingement angle, etc. Similar issues regarding resulting residual stress variability can be described for other treatment processes such as gravity shot peening, laser shock peening and other surface finishing methods.

Currently no comprehensive design tool exists to predict the fatigue behavior of metallic systems in the presence of deep compressive residual stresses induced by surface treatments (i.e., shot peen, laser shock processing and low plasticity burnishing). Aerospace companies typically use a quasi-empirical method of specimen/component testing and data evaluation to determine the component life capability. The reliance on testing requires significant time and money to validate an approach.

The life prediction methodologies currently available are limited to traditional long crack growth modeling with no consideration of crack nucleation or short crack growth phases. That is:

- The durability benefit is limited to the depth of the residual stress induced. Large crack growth is not effected by the residual stress.
- The durability benefit is realized in the crack nucleation and short crack growth regions. This region is on the order of a few grains and is typically less than 0.010 inches deep into the component.
- Crack nucleation and small crack growth are highly variable affected by the local microstructure, making the modeling/prediction process difficult
- VEXTEC has developed a microstructural methodology that has demonstrated ability to predict the microstructural influence on durability for a number of aerospace materials.

It has been thoroughly established by VEXTEC (and others) under the DoD High Cycle Fatigue (HCF) Science and Technology (S&T) Program that long crack growth (such as conventional linear elastic fracture mechanics) is only valid when the crack length is many times the material grain size. This is certainly not the case for surface treatment influences where the grain size is large relative to the residual stress field. For example, in the case of a large grain material where the grain diameter is .005 to .010 in., the material is not within the linear elastic guidelines and the only accurate means for life prediction must be based on crack nucleation and short crack growth modeling. In addition, cast structures typically have very large grains (.025 in and greater) where the residual stress profile of all forms of surface treatment will likely lie completely within one grain, thus emphasizing the need for surface treatment lifing capabilities that are nonexistent today.

## State of the Art Lifing Assessment

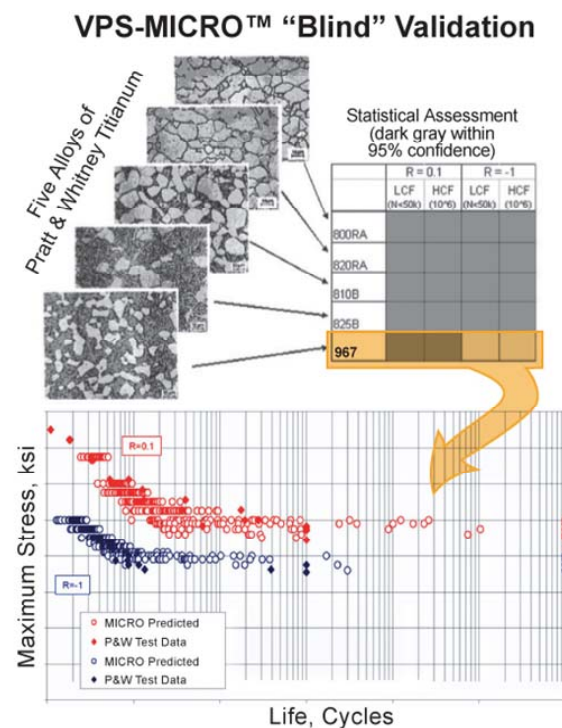
Under previous NAVAIR and AFRL SBIR contracts, VEXTEC has developed a micromechanics-based, probabilistic simulation software, VPS-MICRO™, for fatigue crack nucleation and small crack growth prediction.

Pratt & Whitney (P&W) provided a 3<sup>rd</sup> party assessment of the fatigue simulation software (VPS-MICRO<sup>TM</sup>). VEXTEC, given only monotonic test data (i.e., stress/strain curves), micrographs and a single fatigue test (life) point for each of 5 P&W proprietary heat treatments, predicted Ti-6Al-4V material fatigue life curves with 95%+ confidence (see Figure 1). The solid symbols are experimental test results, the open symbols are VPS-MICRO<sup>TM</sup> predictions for 50 test bars at each stress level. This was a blind prediction, VEXTEC performed the simulation at the conditions specified by Pratt & Whitney and then provided the predictions to Pratt & Whitney for comparison to their experimental test results without knowing the actual results. Figure 1 shows excellent correlation between the VEXTEC predictions and the observed fatigue capability.

This microstructural analysis tool was developed knowing that most design engineers are not trained in material science. Hence a strategy for obtaining the required material-specific microstructural input parameters had to be created such that engineers accustomed to normally working in a finite element method (FEM) software environment could use VPS-MICRO<sup>TM</sup>. This issue was resolved through the incorporation of a scroll-down menu of available material reference libraries. The data for which these libraries would be populated through built-in reference databases. Within a conventional aerospace organizational structure, the material development experts would be responsible for the construction and maintenance of these reference databases, thus allowing the designer to use VPS-MICRO<sup>TM</sup> for component analysis in everyday applications.

Conventional FEM can be used to predict the global stress distribution for a complex component. VEXTEC's innovative software technique translates these global stresses to the grain microstructural level. "Microstress" is predicted using a Voronoi geometry generation algorithm written for use by commercially available FEM software. Microstresses buildup within a grain and eventually result in the nucleation of a crack. Such a crack grows as a short crack through the immediately neighboring grains. Whether or not a crack continues to grow or arrests depends on the amount of energy buildup within the grains as well as the geometric and simulated properties for these grains. A Monte Carlo approach is used to ensure that the simulation matches the previously identified microstructural characteristics established during reference database development.

Aerospace systems consist of large, geometrically complex components. Although the initial VPS-MICRO<sup>TM</sup> validation was conducted on small, simple specimen samples, VEXTEC demonstrated that VPS-MICRO<sup>TM</sup> can account for both size and geometric complexity. VPS-MICRO<sup>TM</sup> uses the typical outputs from FEM analysis to find the elastic global or *macro-stress* at each node of the FEM model. A representative volume element (RVE) is determined for each FEM node. Each RVE is then modeled as a simple test specimen in VPS-MICRO<sup>TM</sup>. Each element can have different microstructures, loadings, failure mechanisms, surface area and volume. Uniquely, VPS-MICRO<sup>TM</sup> predicts fatigue for a large complex component by modeling



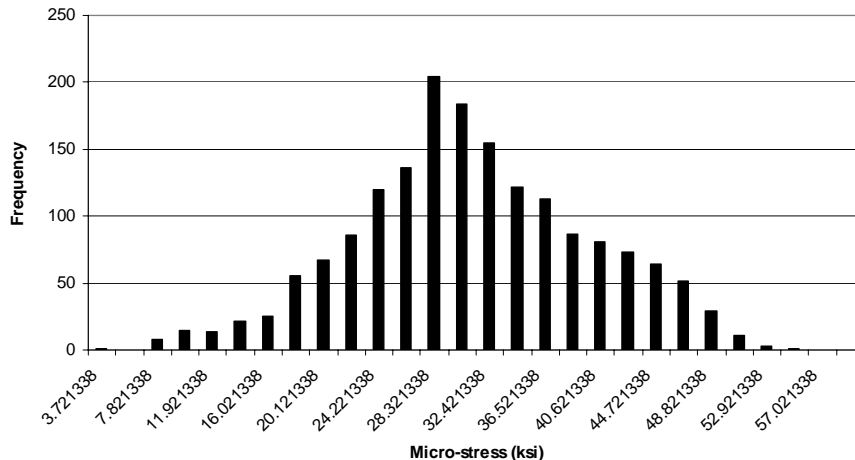
**Figure 1: Validation of VEXTEC SBIR Technology**

an appropriate number of RVE assemblages. Although a large aerostructure, such as a high-pressure turbine disk, can easily be 12 inches in radius and contain more than  $10^{10}$  surface grains, VPS-MICRO™ can conduct this grain-level simulation in computer computation times comparable to commercial FEM software. Although prediction of fleet reliability may have to consider thousands of disks to achieve the desired confidence, VPS-MICRO™ used probabilistic and extreme value statistical techniques for computational efficiency.

The fatigue models can be combined with the x-ray diffraction measurements to address two key aspects of life assessment; 1) prediction of the effect of surface treatment on fatigue life enhancement and 2) prediction of the effect of microstructural variability on statistical scatter in fatigue life.

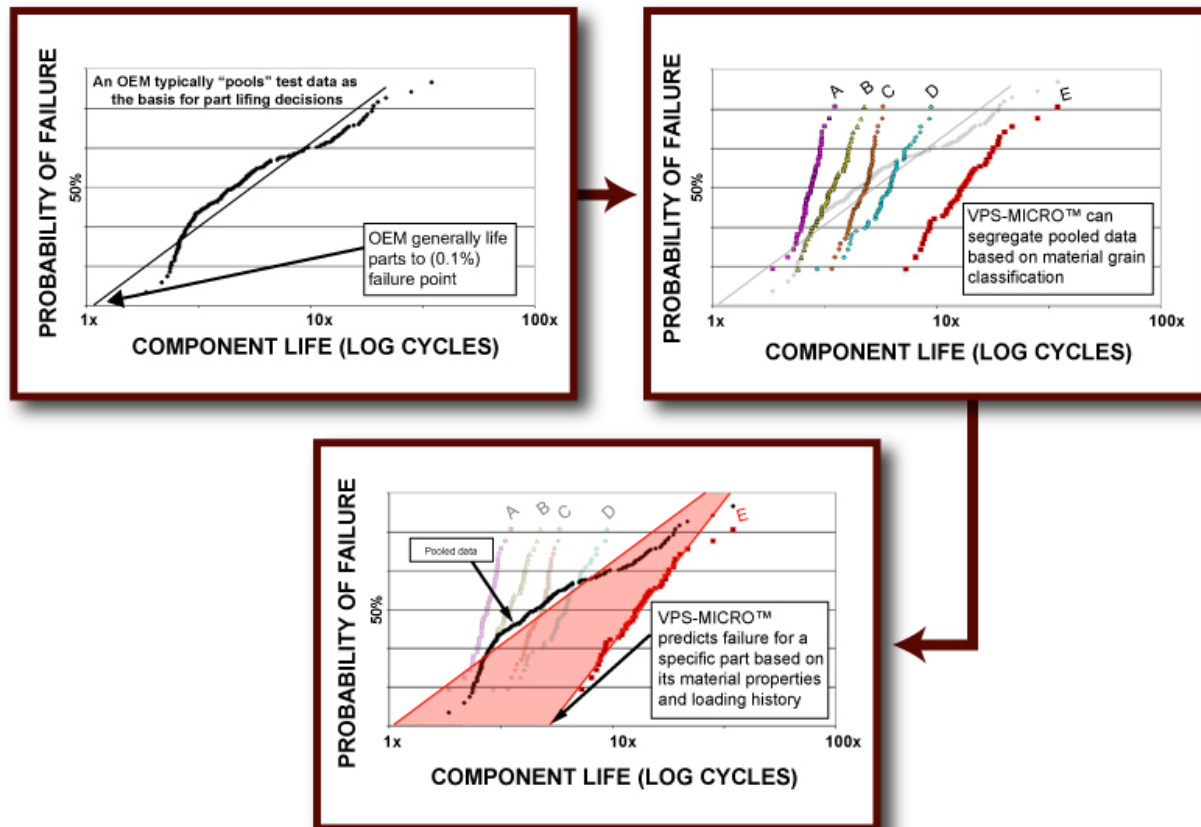
A key aspect of accurate life prediction using VPS-MICRO™ is the ability to incorporate the residual stress field and its influence on fatigue life. The x-ray diffraction technique is a nondestructive technique that provides absolute values for surface residual stresses. The residual stress profile into the surface is used directly in the micromechanical fatigue model.

Recently performed research by VEXTEC in cooperation with Ohio State and DaimlerChrysler has investigated the residual stress state at the microstructural level. Generally, surface residual stress models assume that the material is homogeneous; however at the crack initiation scale this assumption is not correct. Because each grain acts as an anisotropic single crystal that yields along well defined crystallographic planes, microstructural residual stress predictions based on crystal plasticity will be a function of the anisotropic plastic deformation of the grains that compose the structure. **Figure 2** shows the statistical distribution of the residual stress of each grain for a HSLA-50 steel microstructure with 1700 grains. This distribution was predicted using crystal plasticity in a FEA model. The model assumes that the average residual stress is uniformly 30 ksi throughout i.e., the process to produce the residual stress is assumed to be perfect. The variation in the stresses is due solely to the discontinuous nature of the grains and the slip system available for plastic deformation. Notice the wide variation in the distribution. The coefficient of variation is about 30%. For every thousand grains (not a large area), it is expected that several grains will have residual stresses less than 5 ksi even though the residual stress at a global level is a perfectly uniform 30 ksi. It is very important to consider the microstructural residual stress field when considering fatigue reliability because the variation in micro residual stress has far reaching effect. Not only does it influence the stress results due to an additionally applied fatigue load, but each grain has a unique cyclic load ratio. Hence, the corrected modeling of the residual stress field will further improve the life prediction accuracy.



**Figure 2: Statistical distribution of the residual stress field at the microstructural level for HSLA-50 steel.**

The x-ray diffraction technique is of significant interest to VEXTEC not only for its ability to determine surface residuals, but the diagnostic information it can provide on the component microstructural configuration. Information obtained from the x-ray diffraction technique can provide d-spacing versus  $\sin^2\psi$ , intensity versus  $\sin^2\psi$ , and diffraction peak breadth. These data can be used to nondestructively determine the grain size and grain orientation, both key inputs to a micromechanical based fatigue life prediction system. The methods and techniques required to determine grain size and orientation have been noted and described in literature, however, a practical implementation has not yet been implemented. The benefit of a system which can nondestructively incorporate grain size and orientation is shown in Figure 3. This example, is based on Ti 6Al-4V (a common aerospace material), shows that the manufacturers typically utilize a minimum material specification which allows significant variation in grain size and orientation. These data generated from this specification are grouped together and a fatigue capability curve is generated. Through the use of VPS-MICRO™, variations in grain size, orientation and  $\alpha/\beta$  volume fraction can be evaluated and used to segregate the “pooled” data based on the microstructural classification. Therefore, if a nondestructive method for microstructural evaluation existed, the component could be “fingerprinted” and its actual fatigue capability determined much more accurately. This would permit greatly extending a components useful life if it was determined to possess “good” microstructure.



**Figure 3: Fatigue life is strongly influenced by microstructural variations**

Based on the results provided by TEC under the Phase I program, the TEC systems (TEC 1600, and TEC MAX) can provide the experimental data necessary to assess the component microstructure nondestructively. This evaluation, physics based and statistical in nature will provide the grain size as well as orientation distributions necessary for an accurate micromechanical based durability prediction. This approach, integrated with the concept of microstructural “fingerprinting” can provide a significant life extension to both existing and future weapons systems.

**APPENDIX D**  
**RESIDUAL STRESS DATA**

===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: S:\1005\2005\SBIR\50632\18403.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 1 / 0.05" from Edge of Hole / Hoop / ebm

Acquisition date & time: 5/31/2005 0:37pm

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 60.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A -3.15219E-07 B 0.000115735 C 0.0531817 D 147.9227

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00017	154.71	1008.3	3.00	0.26179	161.49	0.780439	0.000017
5.0	0.00552	154.55	1071.1	2.99	0.26152	161.48	0.780451	0.000020
10.0	0.02566	155.84	1018.1	3.08	0.26380	161.56	0.780358	0.000021
15.0	0.05985	157.60	1069.4	3.15	0.26621	161.68	0.780232	0.000027
20.0	0.10856	155.29	1116.0	3.37	0.26671	161.52	0.780402	0.000019
25.0	0.16865	154.99	1045.1	3.30	0.26582	161.51	0.780422	0.000020
30.0	0.23822	155.95	1023.5	3.10	0.26412	161.57	0.780350	0.000016
35.0	0.31525	157.67	1051.2	3.05	0.26482	161.68	0.780226	0.000017
40.0	0.39825	158.54	1311.3	3.01	0.26498	161.74	0.780163	0.000015
45.0	0.48541	157.45	1118.6	2.96	0.26327	161.67	0.780240	0.000013

Fitted Delta D vs Sin^2(psi) Data:

D Spacing Intercept.....: 0.780406  
Slope of Fitted Line.....: -0.0004332  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -4.4 KSI -30.5 MPa

Counting Statistics Stress Error (+/-): 0.3 KSI 2.3 MPa  
Probable error.....(+/-): 1.5 KSI 10.5 MPa

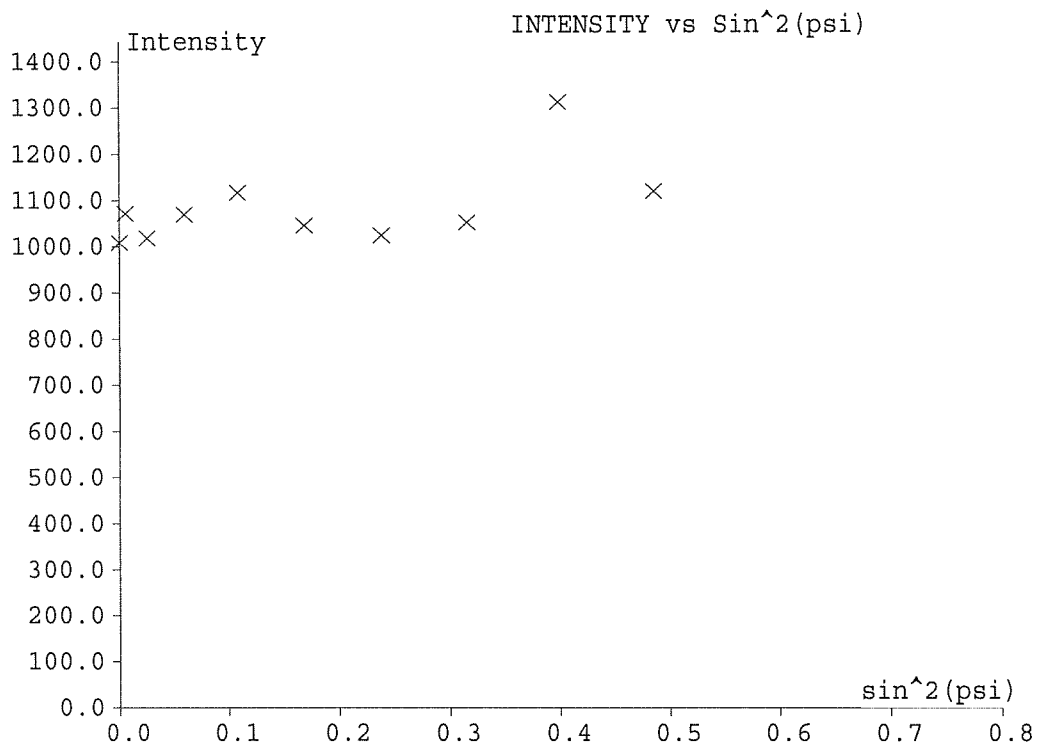
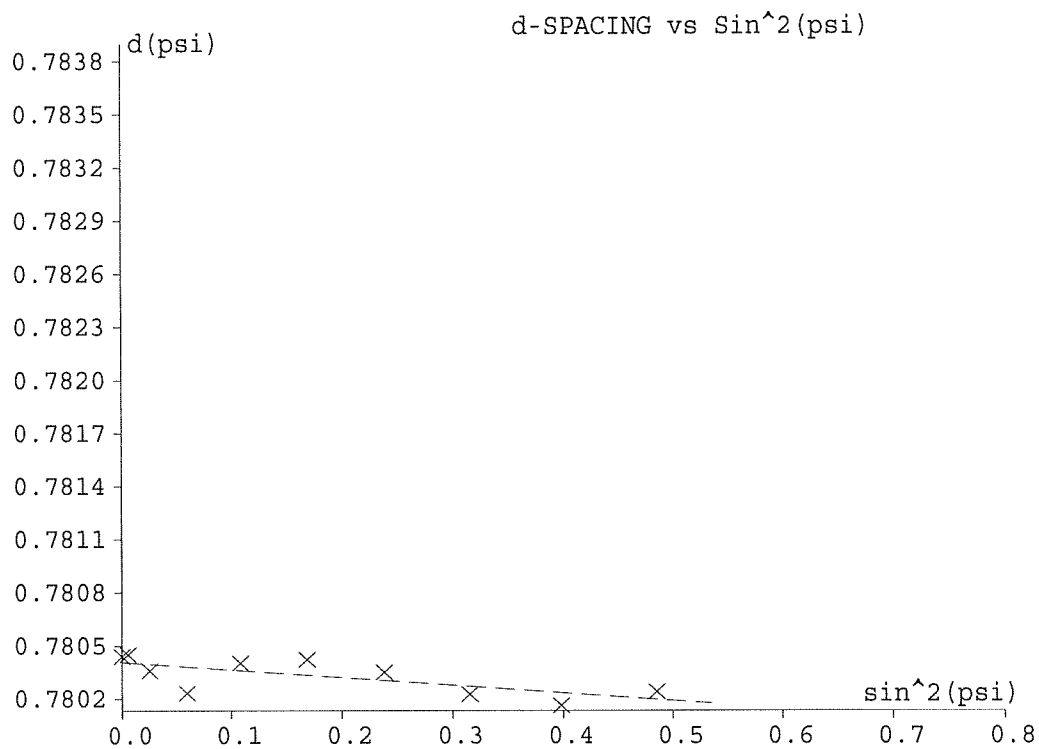


File: S:\1005\2005\SBIR\50632\18403.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 1 / 0.05" from Edge of Hole / Hoop / ebm

*Residual Stress.....:	-4.4 KSI	-30.5 MPa
Counting Statistics Stress Error (+/-):	0.3 KSI	2.3 MPa
Probable error.....(+/-):	1.5 KSI	10.5 MPa



===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: S:\1005\2005\SBIR\50632\18404.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 1 / 0.10" from Edge of Hole / Hoop / ebm

Acquisition date & time: 5/31/2005 1:29pm

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 60.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A -3.15219E-07 B 0.000115735 C 0.0531817 D 147.9227

Psi	Sin <sup>2</sup> (psi)	Pk Chan	Intens	FWHM	Kalp Cor	A	2-Theta	D Spacing	St. Dev.
0.0	0.00016	154.36	1300.5	2.88	0.25933		161.47	0.780462	0.000015
5.0	0.00554	154.19	1162.8	2.88	0.25930		161.46	0.780474	0.000015
10.0	0.02565	155.92	1189.3	3.08	0.26383		161.57	0.780352	0.000017
15.0	0.06013	156.49	1192.4	2.88	0.26105		161.61	0.780308	0.000014
20.0	0.10846	155.49	1191.9	2.98	0.26212		161.54	0.780382	0.000018
25.0	0.16781	156.94	1026.3	3.23	0.26687		161.63	0.780281	0.000031
30.0	0.23838	155.54	1052.3	2.79	0.25866		161.55	0.780375	0.000014
35.0	0.31495	158.13	1203.6	2.71	0.25869		161.72	0.780185	0.000013
40.0	0.39772	159.42	1045.2	2.79	0.26153		161.80	0.780096	0.000015
45.0	0.48615	156.11	1178.8	2.75	0.25826		161.59	0.780332	0.000012

Fitted Delta D vs Sin<sup>2</sup>(psi) Data:

D Spacing Intercept.....: 0.780405  
Slope of Fitted Line.....: -0.000446  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -4.6 KSI -31.4 MPa

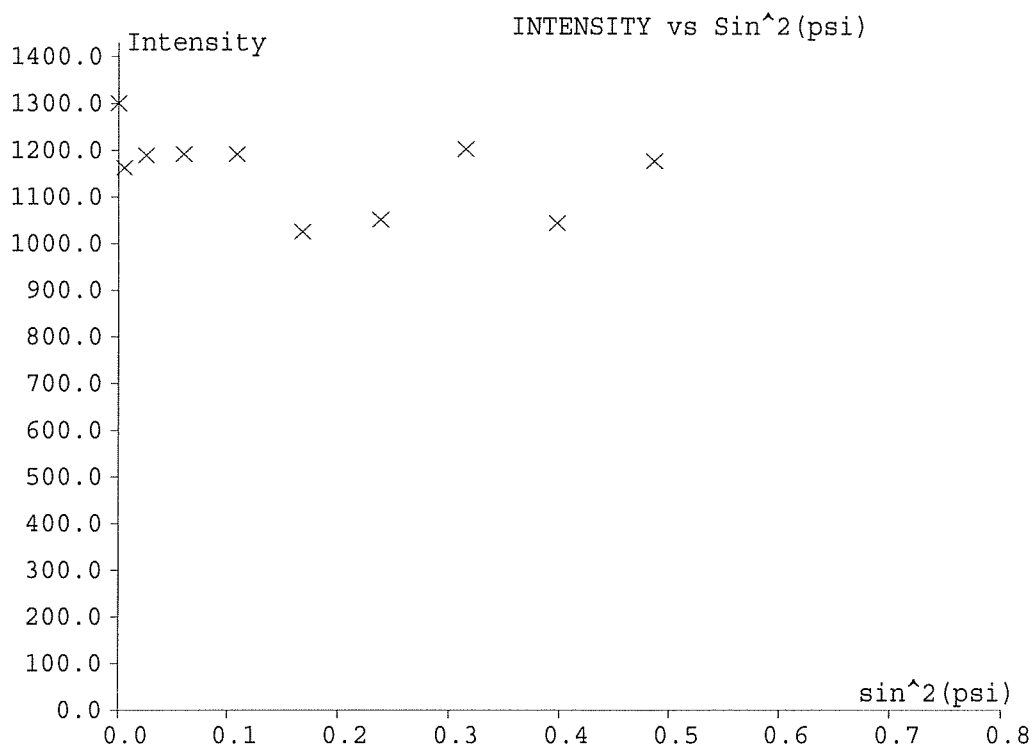
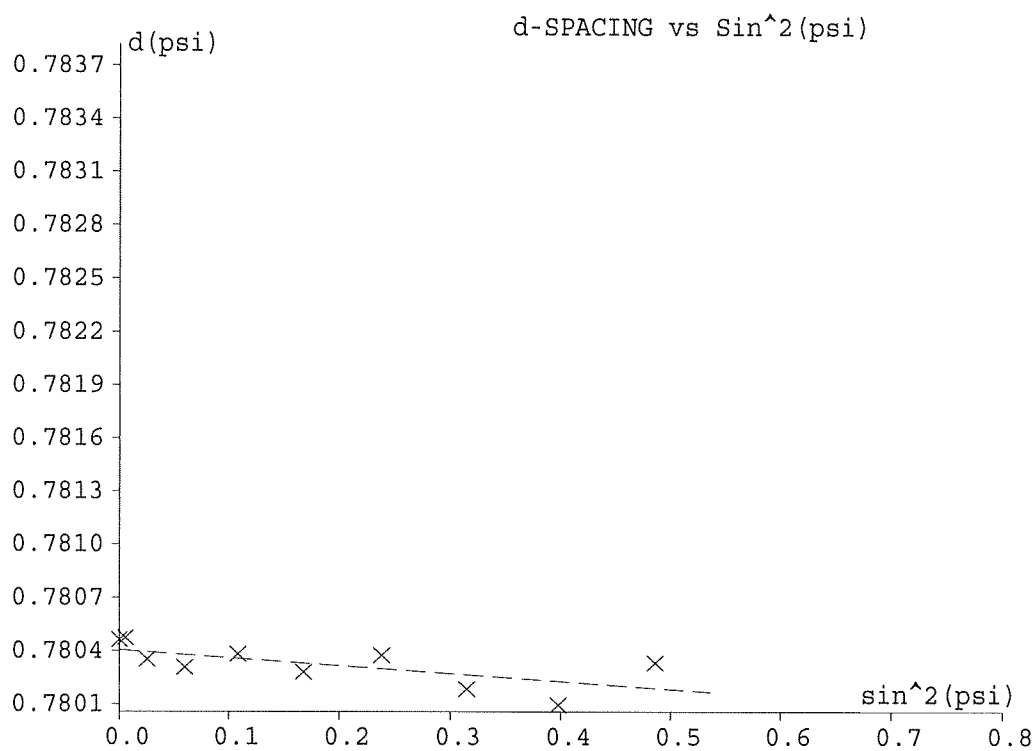
Counting Statistics Stress Error (+/-): 0.3 KSI 1.9 MPa  
Probable error.....(+/-): 1.8 KSI 12.6 MPa

File: S:\1005\2005\SBIR\50632\18404.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 1 / 0.10" from Edge of Hole / Hoop / ebm

*Residual Stress.....:	-4.6 KSI	-31.4 MPa
Counting Statistics Stress Error (+/-):	0.3 KSI	1.9 MPa
Probable error.....(+/-):	1.8 KSI	12.6 MPa



===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: S:\1005\2005\SBIR\50632\18405.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 1 / 0.15" from Edge of Hole / Hoop / ebm

Acquisition date & time: 5/31/2005 2:06pm

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 60.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A -3.15219E-07 B 0.000115735 C 0.0531817 D 147.9227

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00017	154.41	1328.3	2.76	0.25722	161.48	0.780456	0.000013
5.0	0.00548	154.85	1151.8	2.58	0.25235	161.51	0.780418	0.000013
10.0	0.02584	154.87	1307.4	3.07	0.26288	161.50	0.780428	0.000016
15.0	0.06012	156.53	1197.2	2.85	0.26054	161.61	0.780304	0.000016
20.0	0.10846	155.46	1188.0	2.86	0.25979	161.54	0.780381	0.000016
25.0	0.16778	156.99	1041.2	3.13	0.26541	161.64	0.780276	0.000017
30.0	0.23845	155.40	1098.8	2.79	0.25839	161.54	0.780385	0.000013
35.0	0.31501	158.05	1290.1	2.74	0.25955	161.71	0.780192	0.000014
40.0	0.39856	157.96	1052.2	2.95	0.26349	161.71	0.780203	0.000024
45.0	0.48561	157.08	1196.1	2.86	0.26112	161.65	0.780264	0.000014

Fitted Delta D vs Sin^2(psi) Data:

D Spacing Intercept.....: 0.780409  
Slope of Fitted Line.....: -0.0004323  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -4.4 KSI -30.4 MPa

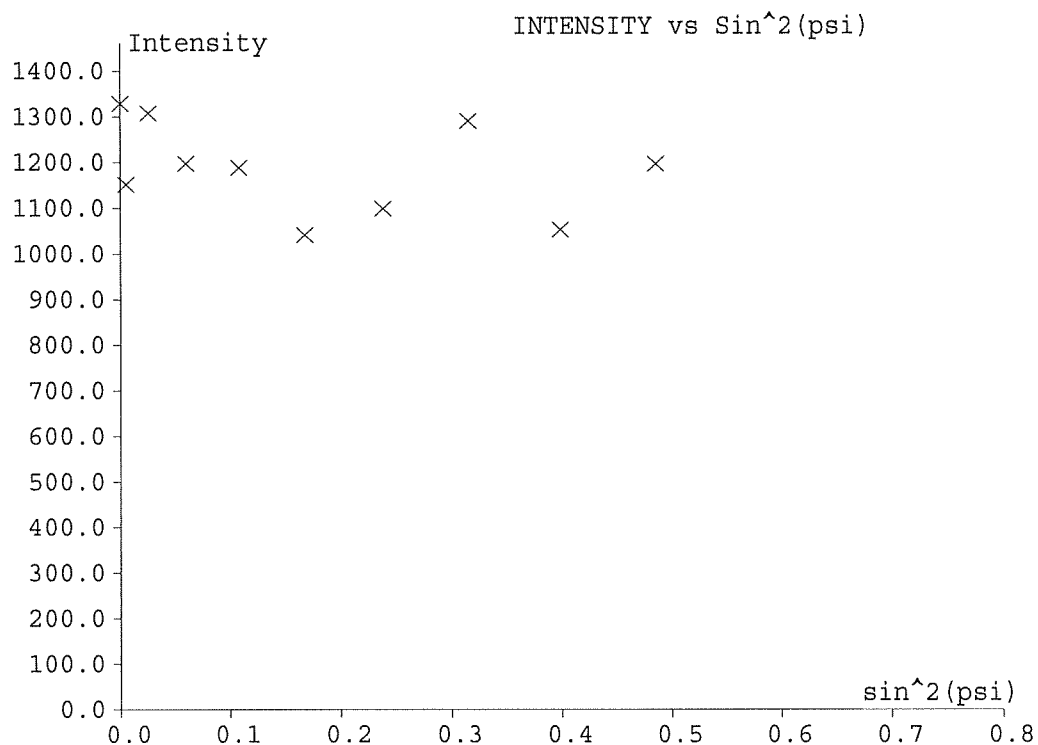
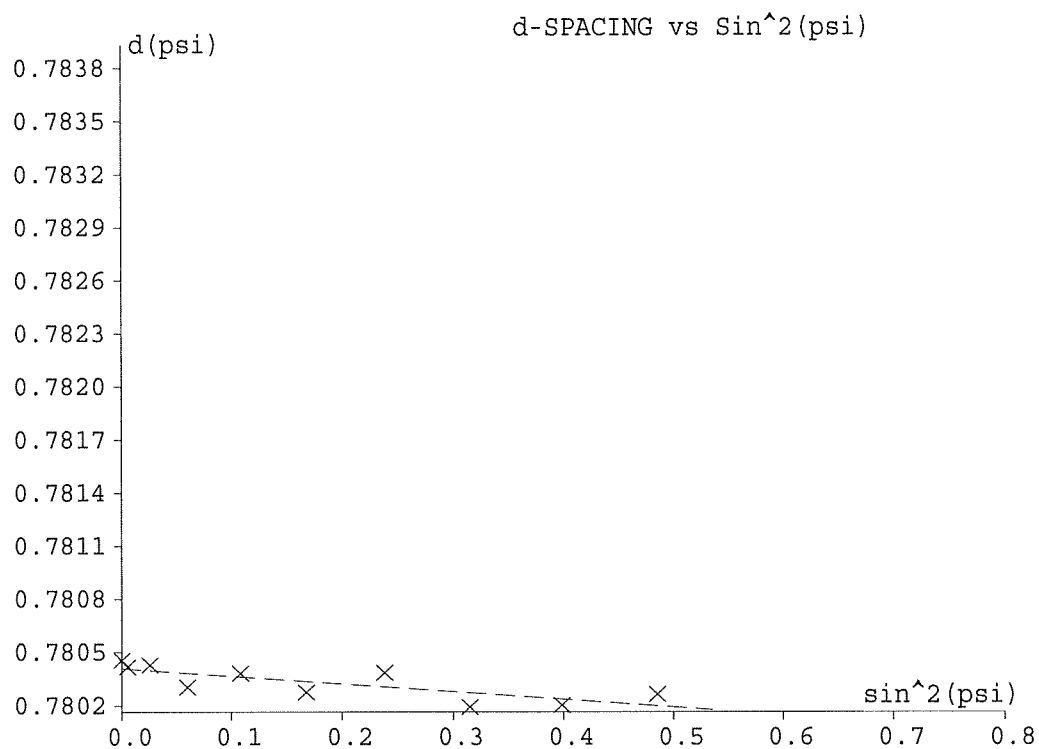
Counting Statistics Stress Error (+/-): 0.3 KSI 2.2 MPa  
Probable error.....(+/-): 1.2 KSI 8.5 MPa

File: S:\1005\2005\SBIR\50632\18405.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 1 / 0.15" from Edge of Hole / Hoop / ebm

*Residual Stress.....:	-4.4 KSI	-30.4 MPa
Counting Statistics Stress Error (+/-):	0.3 KSI	2.2 MPa
Probable error.....(+/-):	1.2 KSI	8.5 MPa



===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: S:\1005\2005\SBIR\50632\18406.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 2 / 0.05" from Edge of Hole / Hoop / ebm

Acquisition date & time: 5/31/2005 2:15pm

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 30.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A -3.15219E-07 B 0.000115735 C 0.0531817 D 147.9227

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00025	159.53	953.0	3.28	0.26960	161.80	0.780096	0.000023
5.0	0.00466	165.22	1003.8	3.25	0.27405	162.17	0.779697	0.000034
10.0	0.02476	160.90	985.9	3.16	0.26913	161.89	0.779998	0.000027
15.0	0.05915	160.24	985.0	3.29	0.27032	161.85	0.780046	0.000024
20.0	0.10631	161.70	960.0	3.46	0.27346	161.94	0.779945	0.000043
25.0	0.16540	162.70	744.2	3.58	0.27556	162.01	0.779877	0.000480
30.0	0.23498	162.70	928.5	3.33	0.27292	162.01	0.779873	0.000025
35.0	0.31242	163.07	920.8	3.22	0.27190	162.03	0.779846	0.000029
40.0	0.39665	161.42	1094.3	3.02	0.26745	161.93	0.779959	0.000023
45.0	0.48195	163.56	1029.8	3.01	0.26896	162.07	0.779808	0.000021

Fitted Delta D vs Sin^2(psi) Data:

D Spacing Intercept.....: 0.779954  
Slope of Fitted Line.....: -0.0002212  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -2.3 KSI -15.6 MPa

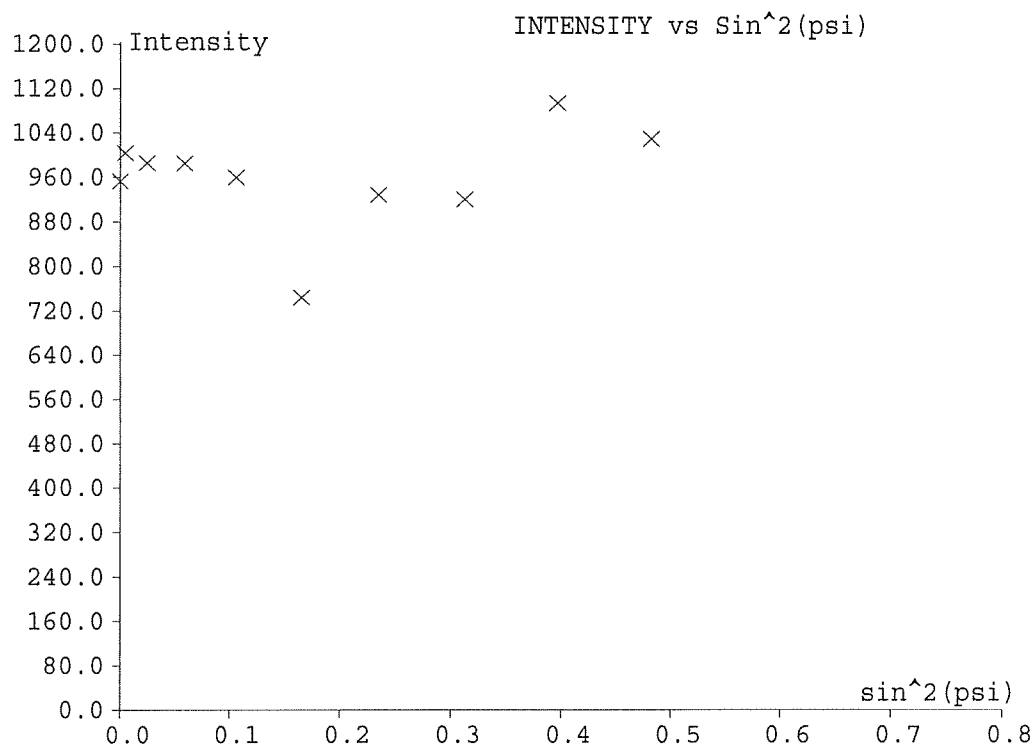
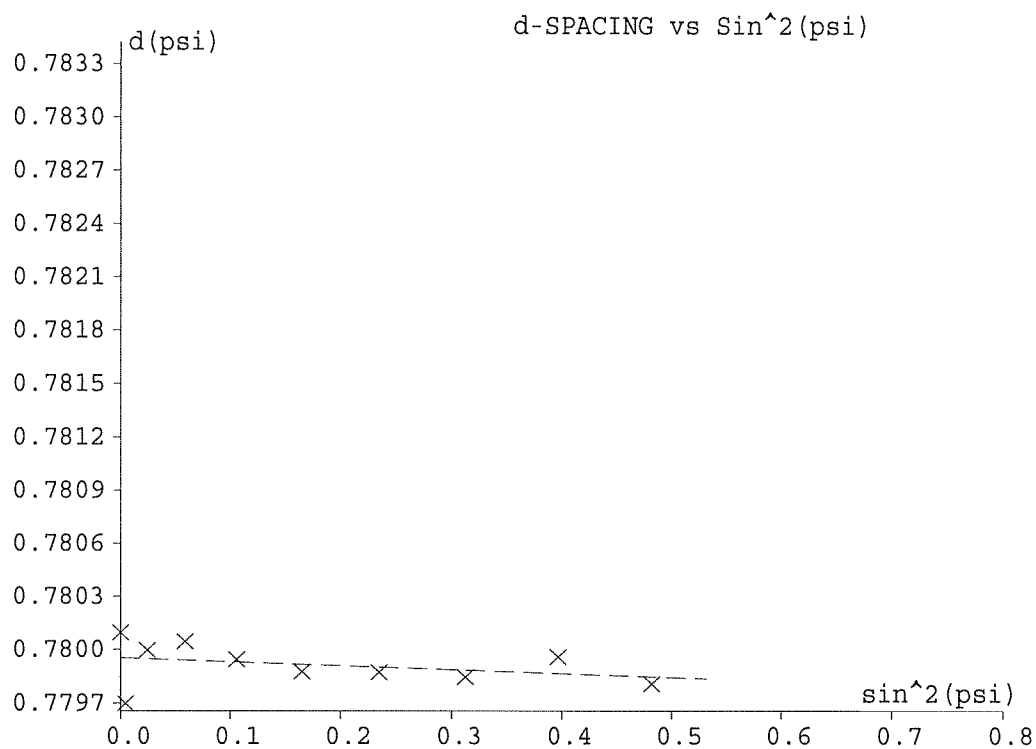
Counting Statistics Stress Error (+/-): 0.6 KSI 3.8 MPa  
Probable error.....(+/-): 2.4 KSI 16.3 MPa

File: S:\1005\2005\SBIR\50632\18406.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 2 / 0.05" from Edge of Hole / Hoop / ebm

*Residual Stress.....:	-2.3 KSI	-15.6 MPa
Counting Statistics Stress Error (+/-):	0.6 KSI	3.8 MPa
Probable error.....(+/-):	2.4 KSI	16.3 MPa



===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: S:\1005\2005\SBIR\50632\18407.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 2 / 0.10" from Edge of Hole / Hoop / ebm

Acquisition date & time: 5/31/2005 2:25pm

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 30.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A -3.15219E-07 B 0.000115735 C 0.0531817 D 147.9227

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00025	159.65	1158.1	3.30	0.26986	161.81	0.780088	0.000023
5.0	0.00495	161.50	1138.5	3.10	0.26877	161.93	0.779955	0.000028
10.0	0.02464	161.53	1099.1	2.97	0.26679	161.94	0.779950	0.000029
15.0	0.05862	162.16	1104.3	3.12	0.26951	161.98	0.779908	0.000023
20.0	0.10684	160.05	1136.0	2.86	0.26327	161.84	0.780052	0.000022
25.0	0.16556	162.29	1234.2	3.43	0.27368	161.98	0.779903	0.000047
30.0	0.23576	161.06	1203.1	3.21	0.27010	161.90	0.779987	0.000026
35.0	0.31347	161.04	1168.3	3.10	0.26834	161.90	0.779987	0.000021
40.0	0.39656	161.54	1063.6	2.92	0.26578	161.94	0.779948	0.000019
45.0	0.48343	160.67	1139.9	2.38	0.24864	161.90	0.779992	0.000019

Fitted Delta D vs Sin^2(psi) Data:

D Spacing Intercept.....: 0.779982  
Slope of Fitted Line.....: -2.951E-05  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -0.3 KSI -2.1 MPa

Counting Statistics Stress Error (+/-): 0.4 KSI 3.0 MPa  
Probable error.....(+/-): 1.2 KSI 8.4 MPa

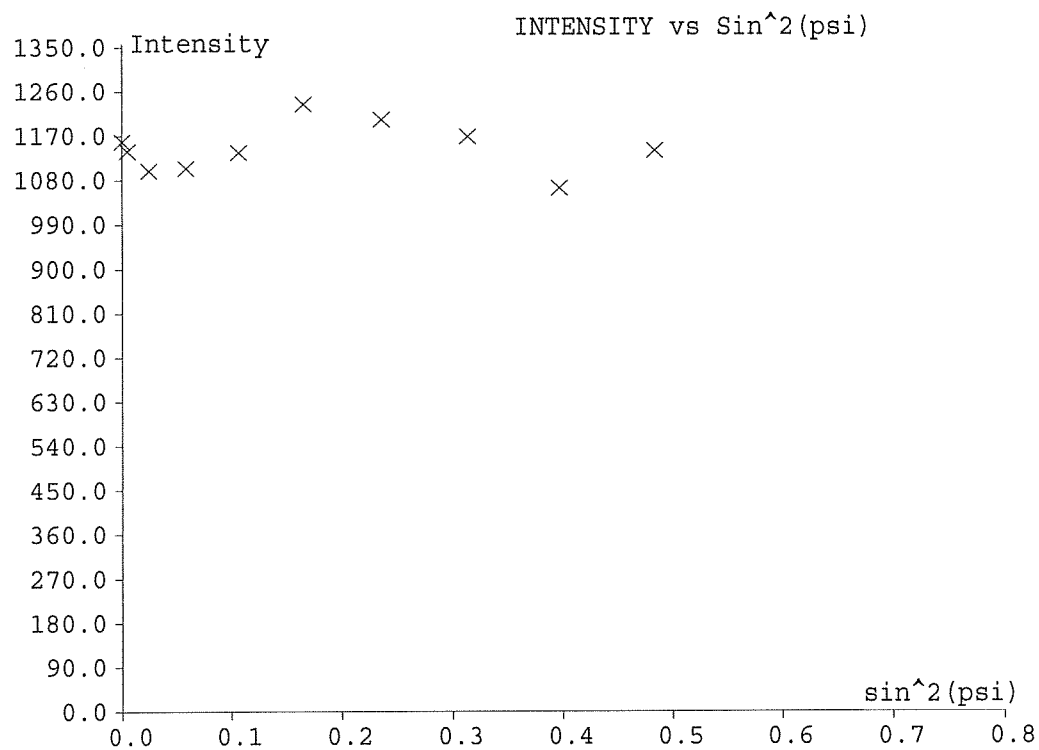
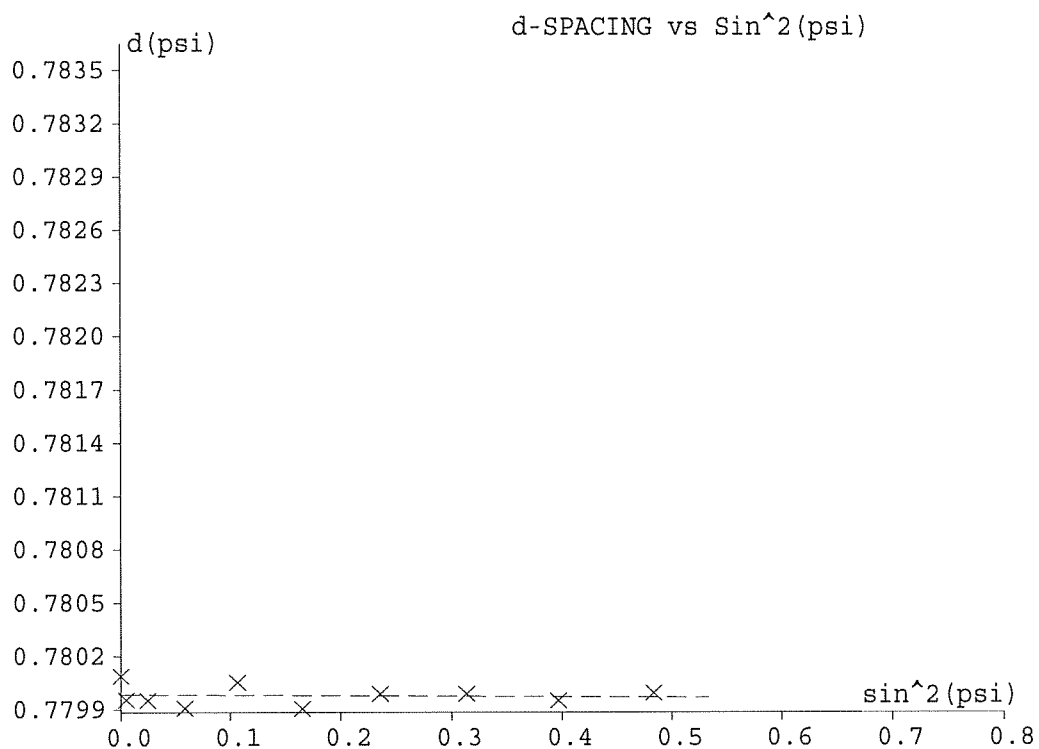


File: S:\1005\2005\SBIR\50632\18407.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 2 / 0.10" from Edge of Hole / Hoop / ebm

*Residual Stress.....:	-0.3 KSI	-2.1 MPa
Counting Statistics Stress Error (+/-):	0.4 KSI	3.0 MPa
Probable error.....(+/-):	1.2 KSI	8.4 MPa



===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: S:\1005\2005\SBIR\50632\18408.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 2 / 0.15" from Edge of Hole / Hoop / ebm

Acquisition date & time: 5/31/2005 2:32pm

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 30.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A -3.15219E-07 B 0.000115735 C 0.0531817 D 147.9227

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00024	158.83	1218.1	2.99	0.26497	161.76	0.780142	0.000021
5.0	0.00508	159.80	1311.3	2.99	0.26577	161.82	0.780073	0.000018
10.0	0.02493	159.96	1080.5	3.20	0.26898	161.83	0.780065	0.000022
15.0	0.05848	162.69	1190.3	3.09	0.26945	162.01	0.779870	0.000023
20.0	0.10680	160.14	1067.3	2.82	0.26253	161.85	0.780045	0.000018
25.0	0.16638	160.29	953.0	3.16	0.26860	161.85	0.780041	0.000021
30.0	0.23556	161.52	1259.3	3.49	0.27367	161.93	0.779958	0.000021
35.0	0.31373	160.53	1209.1	3.00	0.26638	161.87	0.780021	0.000022
40.0	0.39647	161.76	1039.1	3.12	0.26922	161.95	0.779936	0.000025
45.0	0.48403	159.82	1262.4	2.79	0.26174	161.83	0.780067	0.000016

Fitted Delta D vs Sin^2(psi) Data:

D Spacing Intercept.....: 0.780042  
Slope of Fitted Line.....: -0.0001094  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -1.1 KSI -7.7 MPa

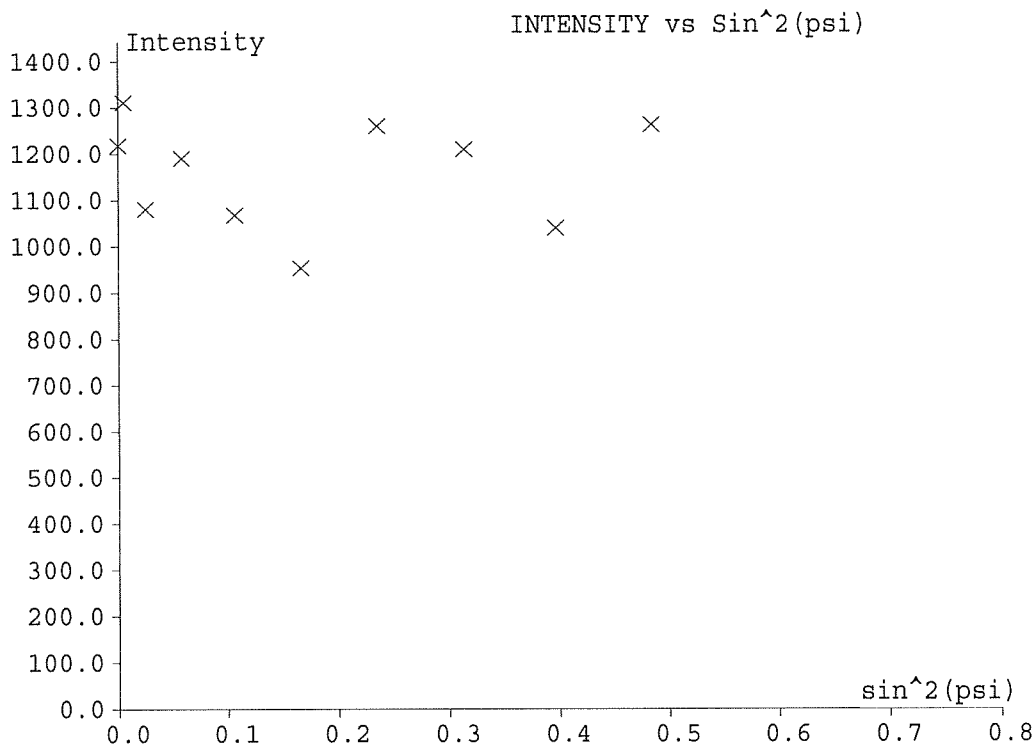
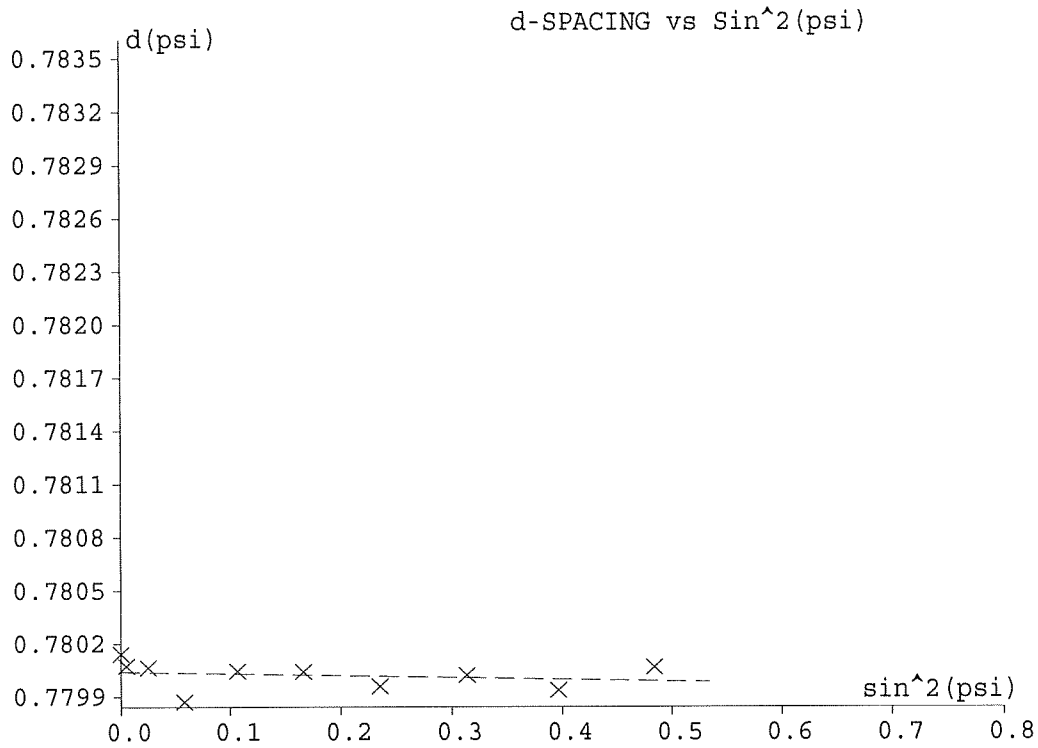
Counting Statistics Stress Error (+/-): 0.4 KSI 2.8 MPa  
Probable error.....(+/-): 1.6 KSI 11.1 MPa

File: S:\1005\2005\SBIR\50632\18408.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 2 / 0.15" from Edge of Hole / Hoop / ebm

*Residual Stress.....	-1.1 KSI	-7.7 MPa
Counting Statistics Stress Error (+/-):	0.4 KSI	2.8 MPa
Probable error.....(+/-):	1.6 KSI	11.1 MPa



===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: S:\1005\2005\SBIR\50632\18409.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 3 / 0.05" from Edge of Hole / Hoop / ebm

Acquisition date & time: 5/31/2005 2:41pm

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 30.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A -3.15219E-07 B 0.000115735 C 0.0531817 D 147.9227

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00017	154.85	974.2	3.03	0.26227	161.50	0.780429	0.000037
5.0	0.00535	156.55	1023.4	3.14	0.26526	161.61	0.780308	0.000025
10.0	0.02567	155.77	974.3	3.09	0.26395	161.56	0.780363	0.000021
15.0	0.06010	156.68	949.3	3.12	0.26507	161.62	0.780298	0.000030
20.0	0.10732	158.77	936.4	3.24	0.26853	161.75	0.780150	0.000038
25.0	0.16773	157.13	880.0	3.15	0.26591	161.65	0.780266	0.000036
30.0	0.23756	157.37	857.2	3.37	0.26855	161.66	0.780252	0.000044
35.0	0.31071	166.44	826.5	3.77	0.28084	162.25	0.779619	0.000058
40.0	0.39838	158.30	1119.5	3.02	0.26500	161.73	0.780180	0.000020
45.0	0.48165	164.19	932.5	3.49	0.27620	162.10	0.779772	0.000038

Fitted Delta D vs Sin^2(psi) Data:

D Spacing Intercept.....: 0.780367  
Slope of Fitted Line.....: -0.001133  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -11.6 KSI -79.7 MPa

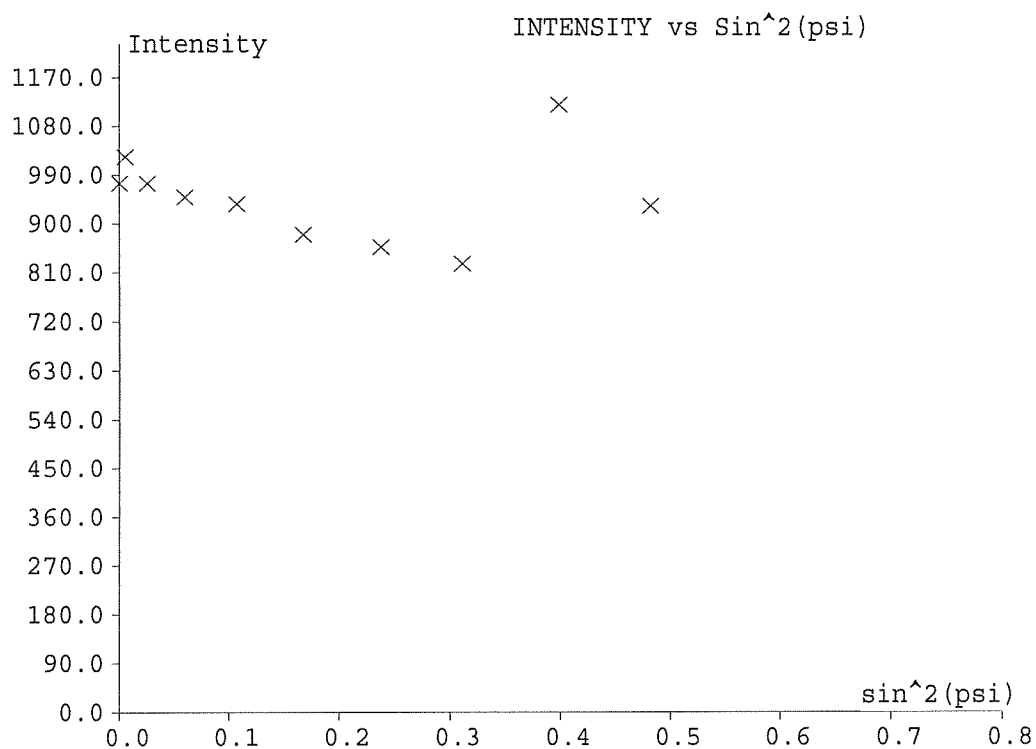
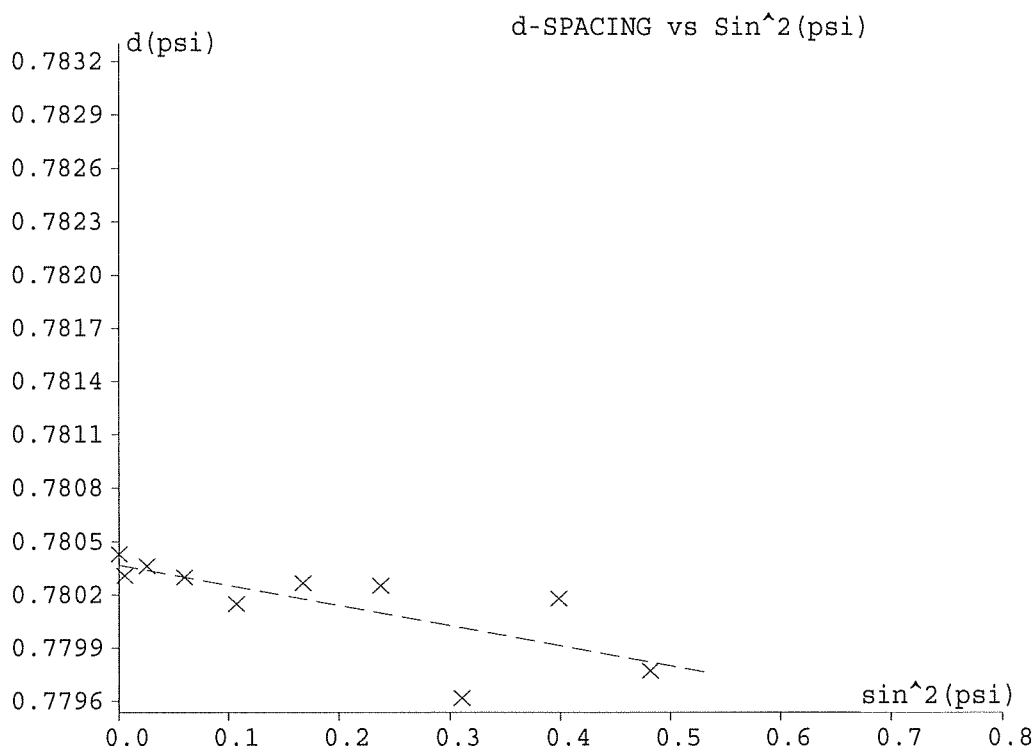
Counting Statistics Stress Error (+/-): 0.7 KSI 4.6 MPa  
Probable error.....(+/-): 3.7 KSI 25.4 MPa

File: S:\1005\2005\SBIR\50632\18409.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 3 / 0.05" from Edge of Hole / Hoop / ebm

*Residual Stress.....:	-11.6 KSI	-79.7 MPa
Counting Statistics Stress Error (+/-):	0.7 KSI	4.6 MPa
Probable error.....(+/-):	3.7 KSI	25.4 MPa



===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: S:\1005\2005\SBIR\50632\18410.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 3 / 0.10" from Edge of Hole / Hoop / ebm

Acquisition date & time: 5/31/2005 2:49pm

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 30.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A -3.15219E-07 B 0.000115735 C 0.0531817 D 147.9227

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp Cor	A	2-Theta	D Spacing	St. Dev.
0.0	0.00022	157.90	1175.9	3.10	0.26572		161.70	0.780210	0.000032
5.0	0.00533	156.79	1206.7	3.09	0.26473		161.63	0.780290	0.000023
10.0	0.02564	155.91	1215.4	2.82	0.25936		161.57	0.780348	0.000022
15.0	0.05994	157.21	1184.1	2.95	0.26298		161.66	0.780257	0.000024
20.0	0.10784	157.26	1163.5	3.06	0.26471		161.66	0.780255	0.000030
25.0	0.16826	155.77	1293.9	2.75	0.25791		161.57	0.780357	0.000023
30.0	0.23893	154.49	1032.1	3.08	0.26273		161.48	0.780456	0.000022
35.0	0.31410	159.90	1003.7	3.26	0.26968		161.83	0.780070	0.000034
40.0	0.39848	158.07	1086.2	2.83	0.26121		161.71	0.780193	0.000022
45.0	0.48466	158.80	1025.6	3.05	0.26586		161.76	0.780145	0.000018

Fitted Delta D vs Sin^2(psi) Data:

D Spacing Intercept.....: 0.780308  
Slope of Fitted Line.....: -0.0002749  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -2.8 KSI -19.4 MPa

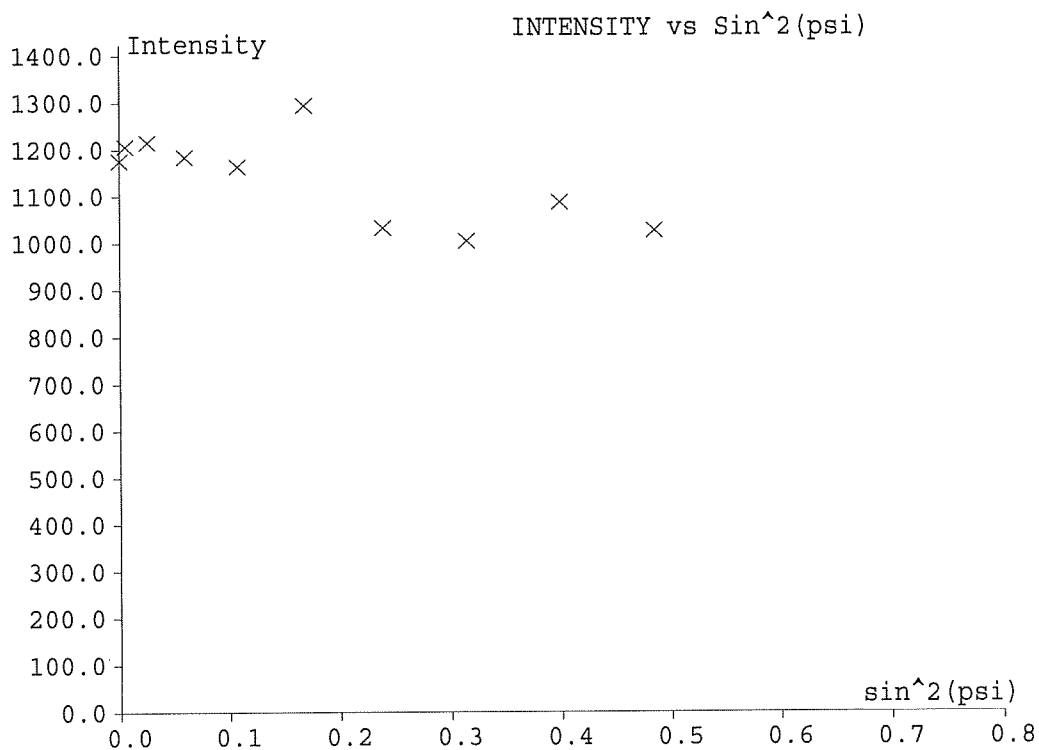
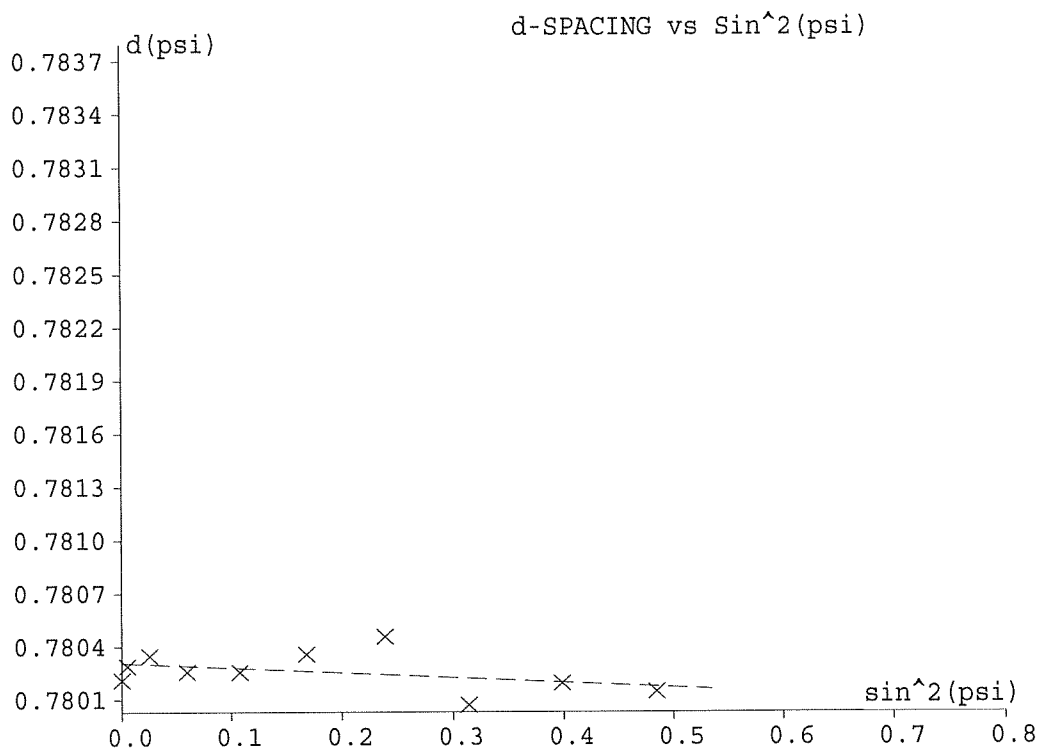
Counting Statistics Stress Error (+/-): 0.5 KSI 3.2 MPa  
Probable error.....(+/-): 2.1 KSI 14.6 MPa

File: S:\1005\2005\SBIR\50632\18410.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 3 / 0.10" from Edge of Hole / Hoop / ebm

*Residual Stress.....:	-2.8 KSI	-19.4 MPa
Counting Statistics Stress Error (+/-):	0.5 KSI	3.2 MPa
Probable error.....(+/-):	2.1 KSI	14.6 MPa



===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: S:\1005\2005\SBIR\50632\18411.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 3 / 0.15" from Edge of Hole / Hoop / ebm

Acquisition date & time: 5/31/2005 3:01pm

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 30.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A -3.15219E-07 B 0.000115735 C 0.0531817 D 147.9227

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00019	156.20	1148.1	3.12	0.26464	161.59	0.780332	0.000024
5.0	0.00546	155.21	1238.3	2.97	0.26175	161.52	0.780402	0.000023
10.0	0.02583	154.90	1192.9	2.99	0.26171	161.50	0.780425	0.000022
15.0	0.06047	155.33	1115.5	3.14	0.26422	161.53	0.780396	0.000025
20.0	0.10867	154.85	1236.0	2.78	0.25792	161.50	0.780425	0.000017
25.0	0.16798	156.54	1278.0	3.19	0.26599	161.61	0.780309	0.000025
30.0	0.23834	155.69	1169.5	2.99	0.26247	161.56	0.780368	0.000035
35.0	0.31635	155.58	1045.0	2.97	0.26200	161.55	0.780375	0.000021
40.0	0.39886	157.44	1211.2	3.00	0.26402	161.67	0.780241	0.000024
45.0	0.48595	156.51	944.4	2.98	0.26291	161.61	0.780308	0.000021

Fitted Delta D vs Sin^2(psi) Data:

D Spacing Intercept.....: 0.780398  
Slope of Fitted Line.....: -0.0002227  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -2.3 KSI -15.7 MPa

Counting Statistics Stress Error (+/-): 0.4 KSI 3.0 MPa  
Probable error.....(+/-): 0.9 KSI 6.5 MPa

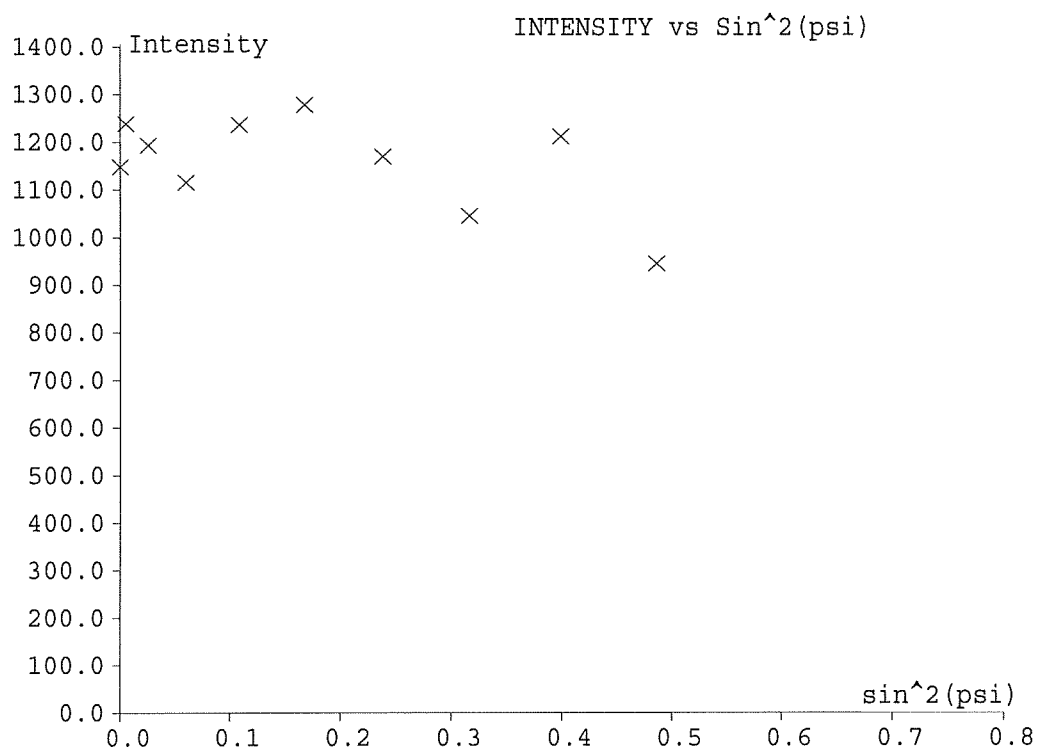
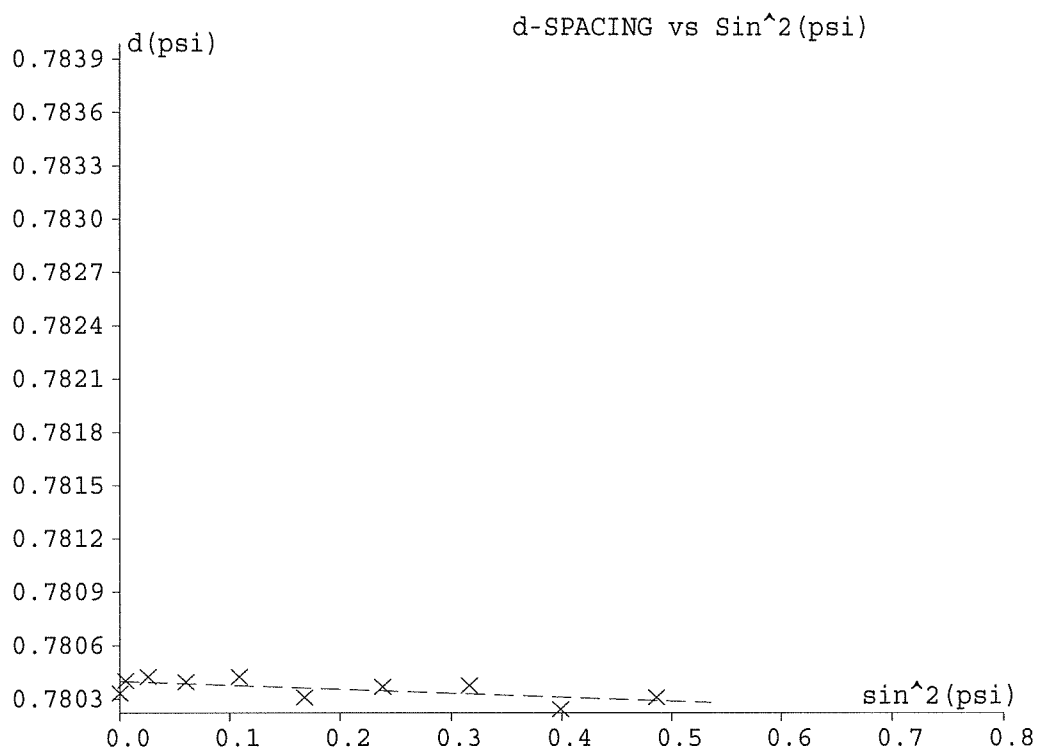


File: S:\1005\2005\SBIR\50632\18411.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 3 / 0.15" from Edge of Hole / Hoop / ebm

*Residual Stress.....:	-2.3 KSI	-15.7 MPa
Counting Statistics Stress Error (+/-):	0.4 KSI	3.0 MPa
Probable error.....(+/-):	0.9 KSI	6.5 MPa



===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: S:\1005\2005\SBIR\50632\18412.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 4 / 0.05" from Edge of Hole / Hoop / ebm

Acquisition date & time: 5/31/2005 3:09pm

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 30.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A -3.15219E-07 B 0.000115735 C 0.0531817 D 147.9227

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp Cor	A	2-Theta	D Spacing	St. Dev.
0.0	0.00019	156.33	951.6	3.24	0.26640		161.59	0.780325	0.000040
5.0	0.00543	155.59	1046.4	2.96	0.26184		161.55	0.780374	0.000026
10.0	0.02546	156.99	1134.4	3.24	0.26694		161.64	0.780278	0.000021
15.0	0.06008	156.80	869.3	3.48	0.26911		161.62	0.780294	0.000036
20.0	0.10711	159.38	967.8	3.33	0.26991		161.79	0.780108	0.000044
25.0	0.16722	158.40	808.0	3.71	0.27234		161.73	0.780181	0.000099
30.0	0.23627	160.01	791.5	3.26	0.26971		161.83	0.780062	0.000039
35.0	0.31511	157.95	1083.9	3.16	0.26673		161.70	0.780207	0.000025
40.0	0.39835	158.38	1146.6	3.12	0.26644		161.73	0.780176	0.000029
45.0	0.48326	161.27	1017.3	3.09	0.26845		161.92	0.779971	0.000022

Fitted Delta D vs Sin^2(psi) Data:

D Spacing Intercept.....: 0.780299  
Slope of Fitted Line.....: -0.0005637  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -5.8 KSI -39.7 MPa

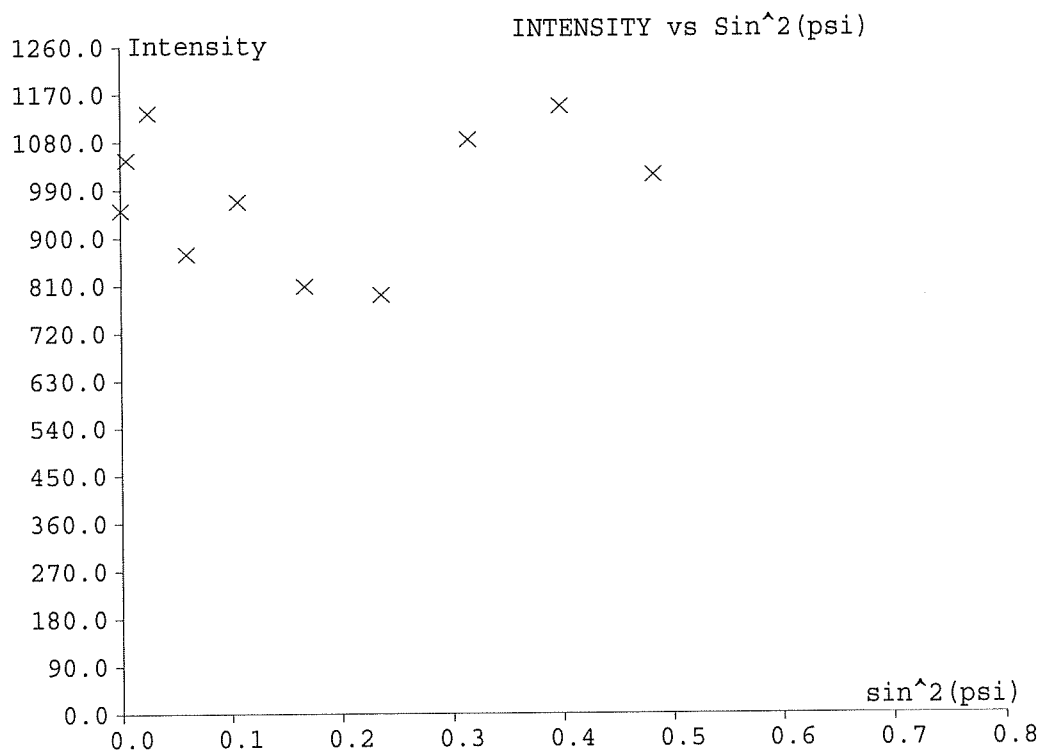
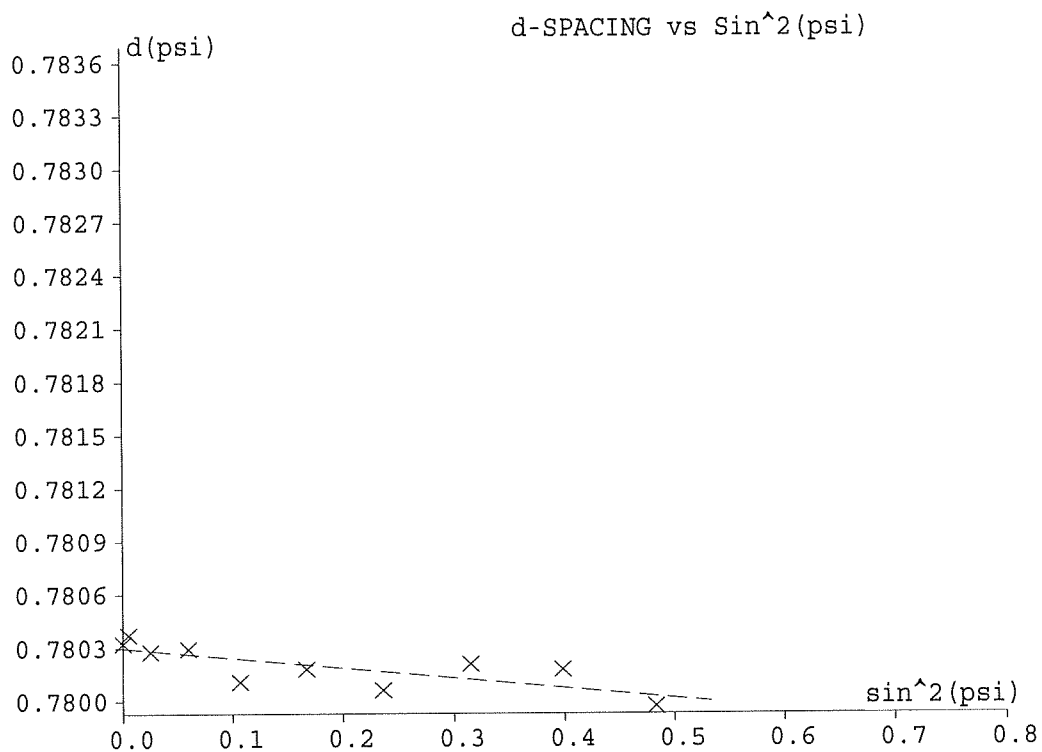
Counting Statistics Stress Error (+/-): 0.6 KSI 3.9 MPa  
Probable error.....(+/-): 1.7 KSI 11.5 MPa

File: S:\1005\2005\SBIR\50632\18412.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 4 / 0.05" from Edge of Hole / Hoop / ebm

*Residual Stress.....:	-5.8 KSI	-39.7 MPa
Counting Statistics Stress Error (+/-):	0.6 KSI	3.9 MPa
Probable error.....(+/-):	1.7 KSI	11.5 MPa



===== TEC Stress Analyzer v1.64 =====  
 ===== Residual Stress Analysis Report =====

File: S:\1005\2005\SBIR\50632\18413.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 4 / 0.10" from Edge of Hole / Hoop / ebm

Acquisition date & time: 5/31/2005 3:18pm

Material [hkl].....: Al 5083-H23 [333]  
 Depth.....: 0.0000000  
 Phi angle.....: 0.00  
 Collimator.....: Round\_4mm  
 Bracket.....: 160s  
 Peak Bounding Range [percent].....: 20  
 X-ray Target Description and Wavelength: copper 1.54056  
 PSI Oscillation Angle Range.....: 2.00  
 Spectra count time (PSI=0).....: 30.0  
 High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
 ADC Channels Full Scale.....: 256  
 Detector Calibration Coefficients:  
 A -3.15219E-07 B 0.000115735 C 0.0531817 D 147.9227

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00017	154.87	1241.7	3.33	0.26601	161.50	0.780432	0.000027
5.0	0.00534	156.67	1167.8	2.88	0.26110	161.62	0.780294	0.000029
10.0	0.02560	156.13	1177.8	2.90	0.26118	161.59	0.780334	0.000020
15.0	0.06053	155.17	1226.5	3.54	0.26826	161.52	0.780412	0.000031
20.0	0.10703	159.57	1035.3	3.08	0.26684	161.81	0.780090	0.000037
25.0	0.16709	158.59	885.8	2.98	0.26457	161.75	0.780159	0.000031
30.0	0.23697	158.50	1016.6	3.00	0.26488	161.74	0.780166	0.000026
35.0	0.31514	157.84	1136.7	2.90	0.26255	161.70	0.780211	0.000023
40.0	0.39883	157.44	1135.0	2.78	0.25975	161.67	0.780237	0.000022
45.0	0.48433	159.29	1060.8	2.72	0.25975	161.80	0.780103	0.000023

Fitted Delta D vs Sin^2(psi) Data:

D Spacing Intercept.....: 0.780323  
 Slope of Fitted Line.....: -0.0004373  
 Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -4.5 KSI -30.8 MPa

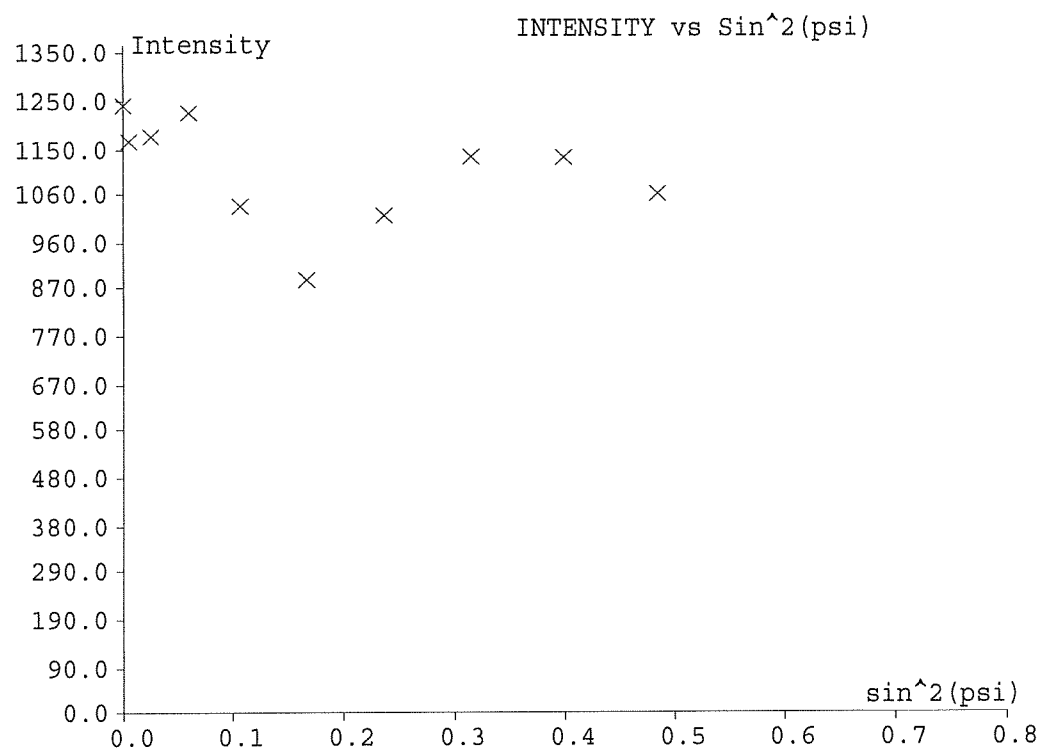
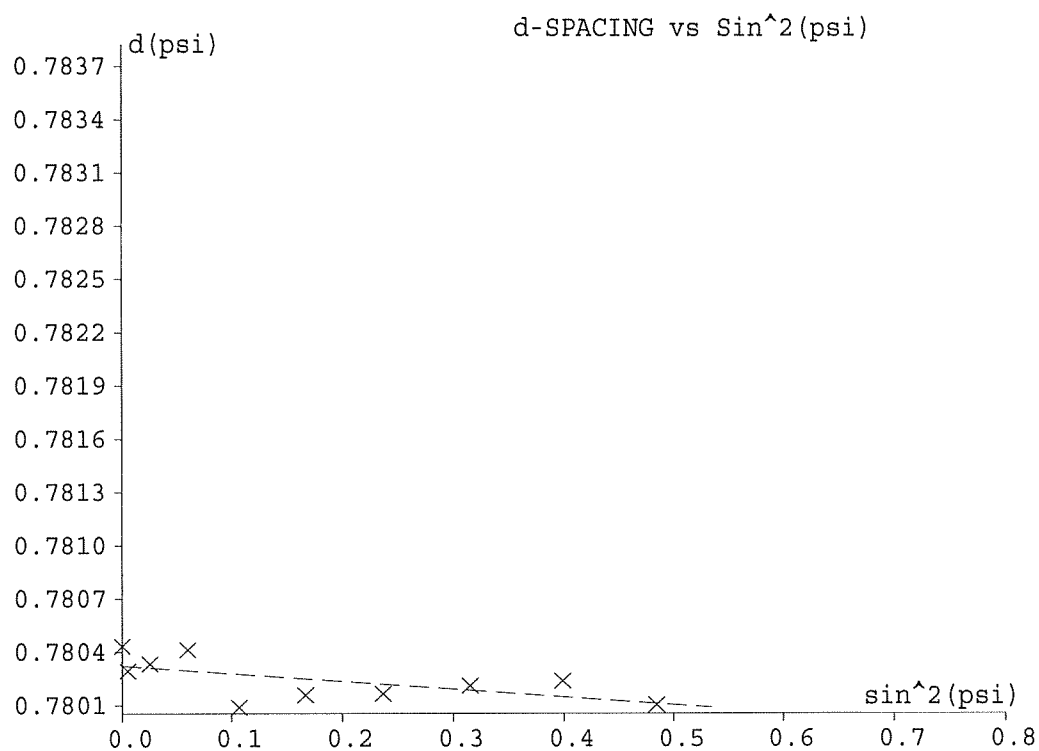
Counting Statistics Stress Error (+/-): 0.5 KSI 3.4 MPa  
 Probable error.....(+/-): 2.0 KSI 13.7 MPa

File: S:\1005\2005\SBIR\50632\18413.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 4 / 0.10" from Edge of Hole / Hoop / ebm

*Residual Stress.....:	-4.5 KSI	-30.8 MPa
Counting Statistics Stress Error (+/-):	0.5 KSI	3.4 MPa
Probable error.....(+/-):	2.0 KSI	13.7 MPa



===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: S:\1005\2005\SBIR\50632\18414.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 4 / 0.15" from Edge of Hole / Hoop / ebm

Acquisition date & time: 5/31/2005 3:31pm

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 30.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A -3.15219E-07 B 0.000115735 C 0.0531817 D 147.9227

Psi	Sin <sup>2</sup> (psi)	Pk Chan	Intens	FWHM	Kalp Cor	A	2-Theta	D Spacing	St. Dev.
0.0	0.00021	157.03	1202.3	3.03	0.26410		161.64	0.780271	0.000028
5.0	0.00537	156.22	1219.9	2.73	0.25782		161.60	0.780323	0.000022
10.0	0.02588	154.63	1200.5	3.08	0.26276		161.49	0.780446	0.000019
15.0	0.06038	155.67	1085.9	3.36	0.26701		161.55	0.780374	0.000032
20.0	0.10788	157.18	1181.3	3.25	0.26721		161.65	0.780264	0.000050
25.0	0.16789	156.73	1115.8	3.06	0.26421		161.62	0.780293	0.000027
30.0	0.23851	155.36	1088.6	3.09	0.26348		161.53	0.780393	0.000018
35.0	0.31620	155.81	1120.2	2.81	0.25913		161.57	0.780355	0.000021
40.0	0.39855	157.90	1203.7	2.71	0.25835		161.71	0.780202	0.000019
45.0	0.48437	159.25	1134.6	2.83	0.26219		161.79	0.780108	0.000018

Fitted Delta D vs Sin<sup>2</sup>(psi) Data:

D Spacing Intercept.....: 0.780367  
Slope of Fitted Line.....: -0.0003516  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -3.6 KSI -24.8 MPa

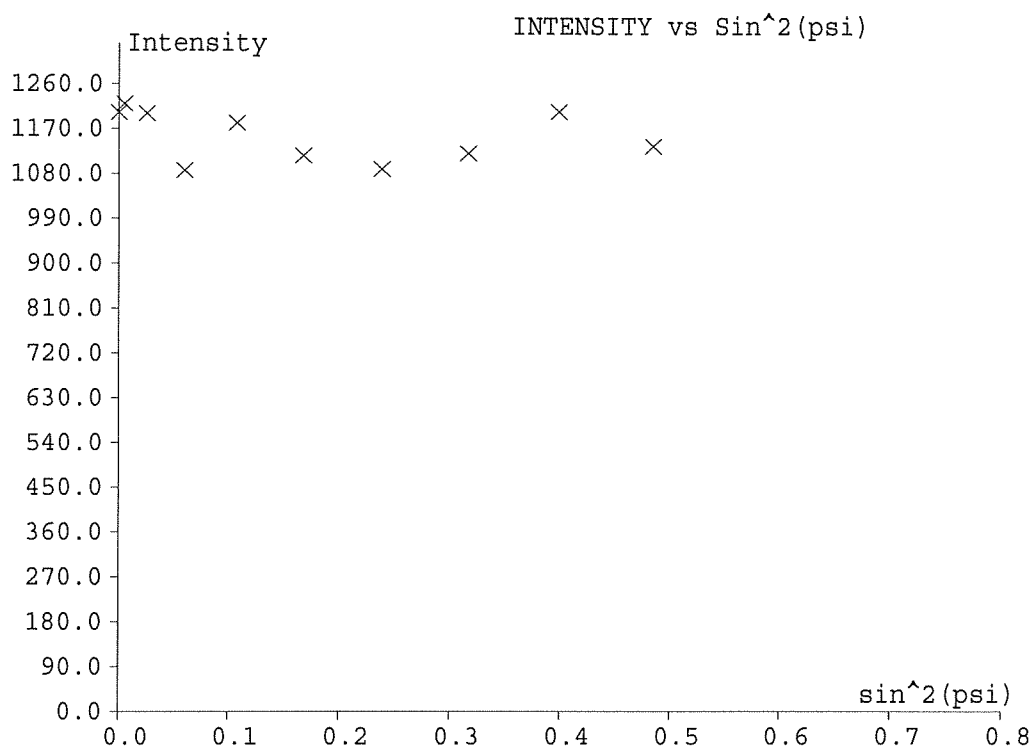
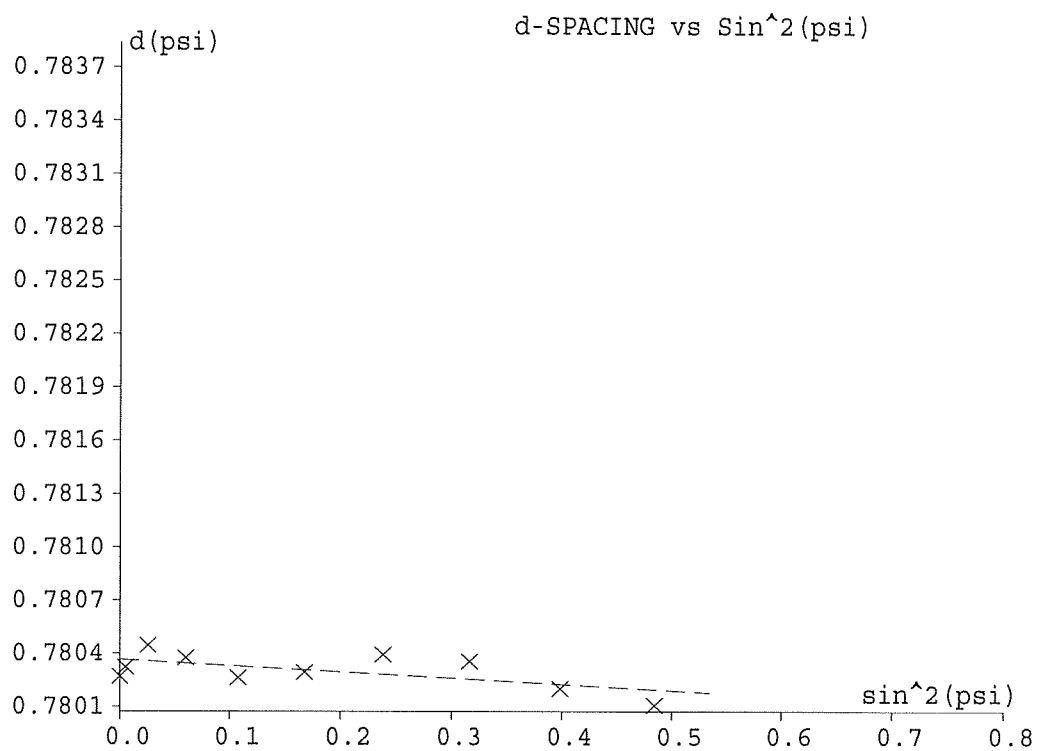
Counting Statistics Stress Error (+/-): 0.4 KSI 3.0 MPa  
Probable error.....(+/-): 1.6 KSI 11.2 MPa

File: S:\1005\2005\SBIR\50632\18414.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 4 / 0.15" from Edge of Hole / Hoop / ebm

*Residual Stress.....:	-3.6 KSI	-24.8 MPa
Counting Statistics Stress Error (+/-):	0.4 KSI	3.0 MPa
Probable error.....(+/-):	1.6 KSI	11.2 MPa



===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: S:\1005\2005\SBIR\50632\18415.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 5 / 0.05" from Edge of Hole / Hoop / ebm

Acquisition date & time: 5/31/2005 3:40pm

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 30.0  
High Voltage(kV) and Beam Current(mA)... 45.00 1.50  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A -3.15219E-07 B 0.000115735 C 0.0531817 D 147.9227

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00023	158.41	838.2	3.25	0.26832	161.73	0.780176	0.000029
5.0	0.00499	161.04	991.8	3.25	0.27055	161.90	0.779989	0.000030
10.0	0.02512	158.82	1034.2	2.93	0.26384	161.76	0.780141	0.000025
15.0	0.05914	160.22	862.3	3.07	0.26729	161.85	0.780044	0.000024
20.0	0.10664	160.76	890.3	3.55	0.27344	161.88	0.780012	0.000025
25.0	0.16482	164.09	885.7	3.68	0.27778	162.09	0.779781	0.000051
30.0	0.23508	162.46	867.2	3.21	0.27118	161.99	0.779889	0.000038
35.0	0.31142	164.97	1028.9	3.16	0.27252	162.16	0.779713	0.000026
40.0	0.39551	163.41	1170.9	2.84	0.26550	162.06	0.779815	0.000018
45.0	0.48038	166.41	951.7	3.34	0.27633	162.25	0.779616	0.000042

Fitted Delta D vs Sin^2(psi) Data:

D Spacing Intercept.....: 0.780090  
Slope of Fitted Line.....: -0.0009647  
Material Stress Constant.....: 1.255E-07

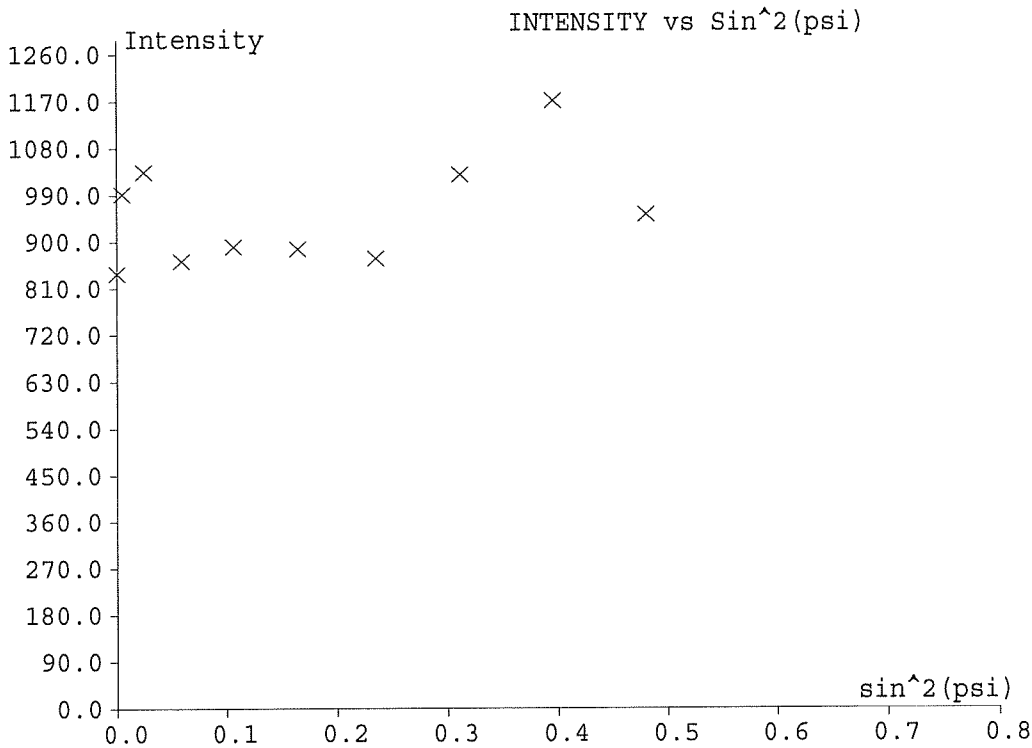
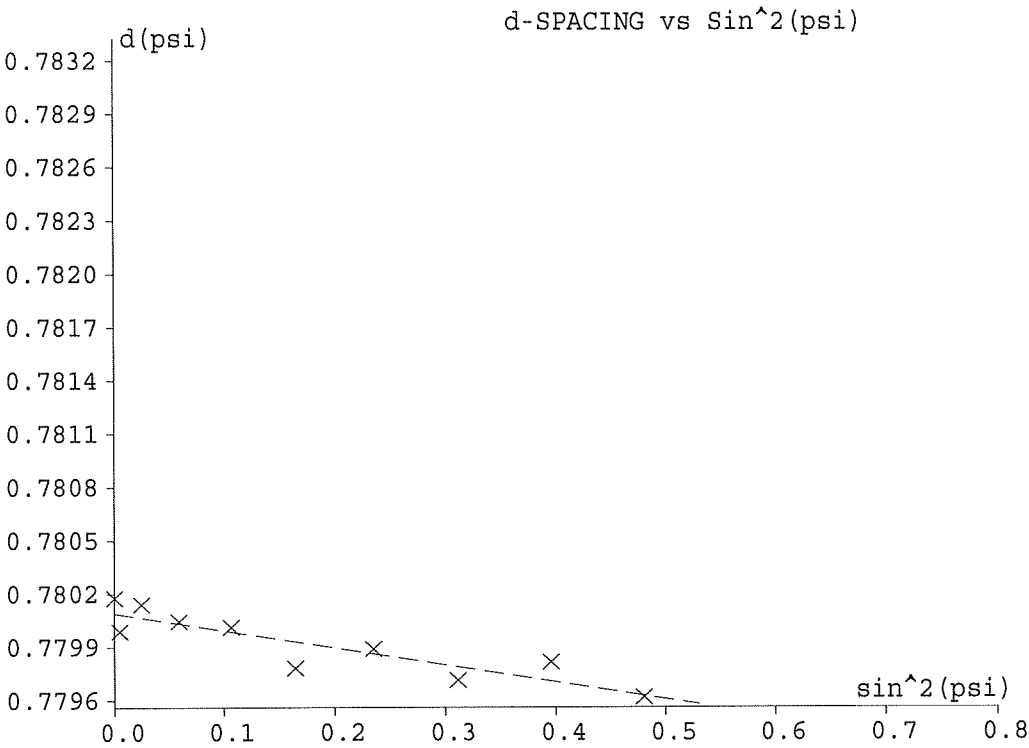
\*Residual Stress.....: -9.9 KSI -67.9 MPa

Counting Statistics Stress Error (+/-): 0.6 KSI 4.4 MPa  
Probable error.....(+/-): 1.8 KSI 12.2 MPa



File: S:\1005\2005\SBIR\50632\18415.STR  
Sample Description:  
SBIR / WP / CW Holes / AF Std. 5 / 0.05" from Edge of Hole / Hoop / ebm

\*Residual Stress.....: -9.9 KSI -67.9 MPa  
Counting Statistics Stress Error (+/-): 0.6 KSI 4.4 MPa  
Probable error.....(+/-): 1.8 KSI 12.2 MPa



===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: S:\1005\2005\SBIR\50632\18416.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 5 / 0.10" from Edge of Hole / Hoop / ebm

Acquisition date & time: 5/31/2005 3:48pm

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 30.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A -3.15219E-07 B 0.000115735 C 0.0531817 D 147.9227

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp Cor	A	2-Theta	D Spacing	St. Dev.
0.0	0.00021	157.52	1159.3	3.07	0.26504		161.67	0.780237	0.000019
5.0	0.00516	158.71	1195.9	2.76	0.26038		161.76	0.780146	0.000022
10.0	0.02488	160.19	1333.0	2.95	0.26535		161.85	0.780044	0.000025
15.0	0.05901	160.70	1124.1	3.05	0.26727		161.88	0.780010	0.000023
20.0	0.10616	162.12	1153.5	3.38	0.27290		161.97	0.779915	0.000047
25.0	0.16610	160.97	1063.6	3.15	0.26912		161.90	0.779993	0.000026
30.0	0.23610	160.33	1082.0	3.18	0.26902		161.86	0.780038	0.000029
35.0	0.31338	161.24	913.8	3.20	0.26999		161.92	0.779974	0.000026
40.0	0.39670	161.27	1057.2	2.83	0.26365		161.92	0.779965	0.000021
45.0	0.48178	163.86	1194.1	3.05	0.26984		162.09	0.779788	0.000022

Fitted Delta D vs Sin^2(psi) Data:

D Spacing Intercept.....: 0.780107  
Slope of Fitted Line.....: -0.0005349  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -5.5 KSI -37.7 MPa

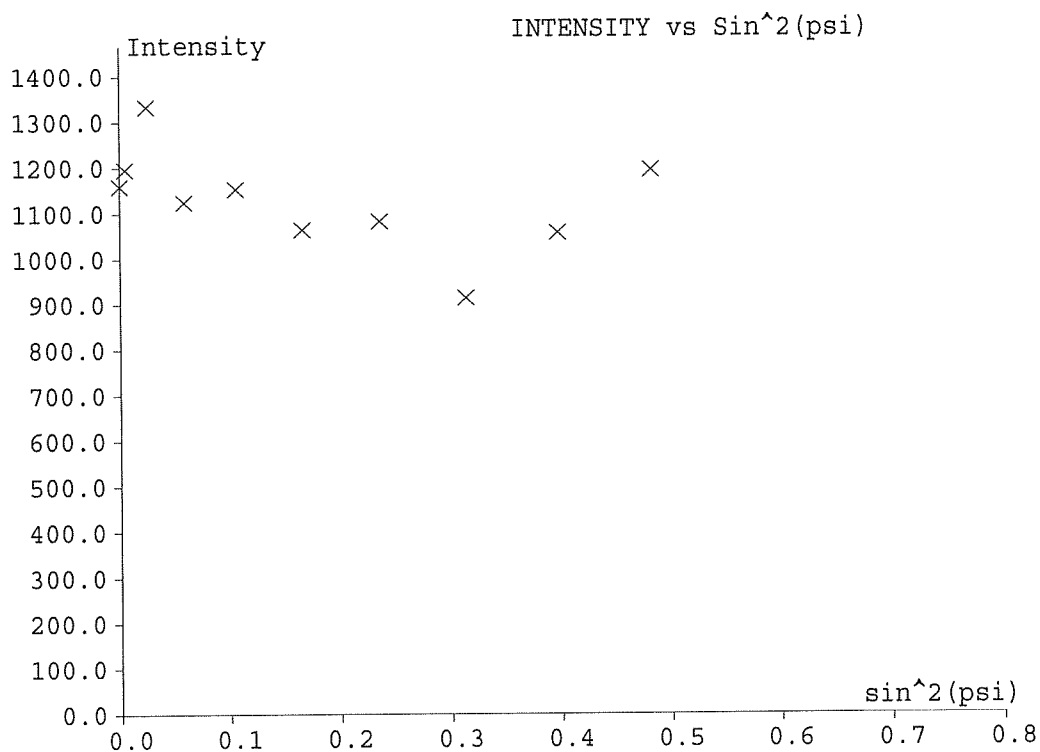
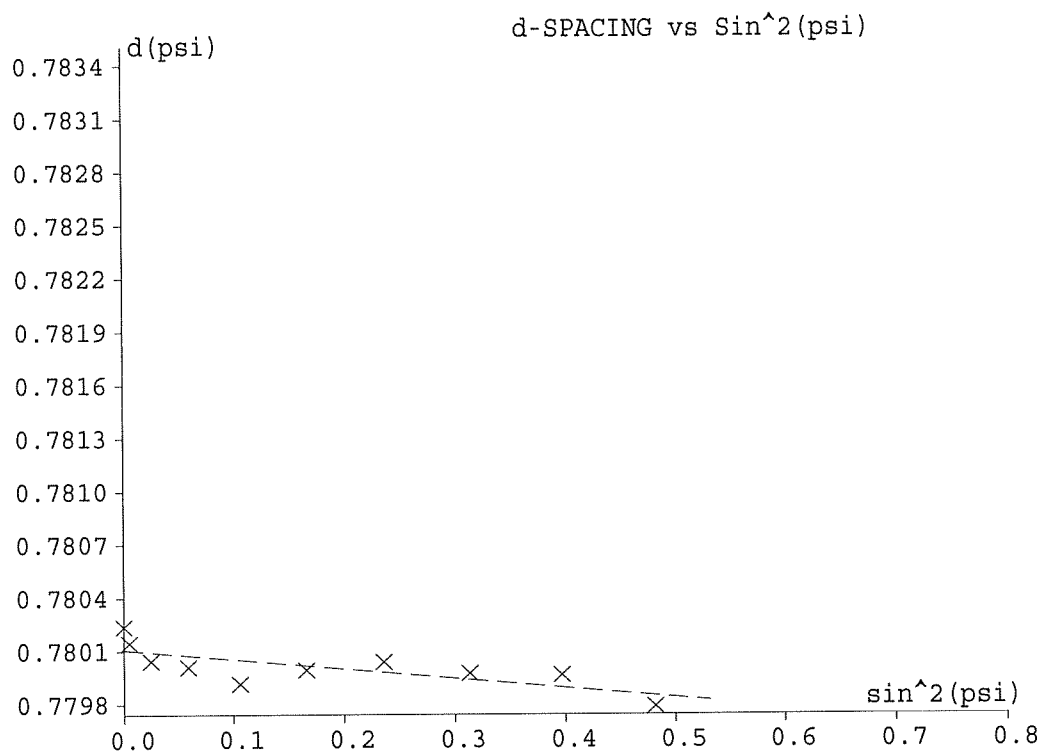
Counting Statistics Stress Error (+/-): 0.5 KSI 3.1 MPa  
Probable error.....(+/-): 1.7 KSI 11.6 MPa

File: S:\1005\2005\SBIR\50632\18416.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 5 / 0.10" from Edge of Hole / Hoop / ebm

*Residual Stress.....:	-5.5 KSI	-37.7 MPa
Counting Statistics Stress Error (+/-):	0.5 KSI	3.1 MPa
Probable error.....(+/-):	1.7 KSI	11.6 MPa



===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: S:\1005\2005\SBIR\50632\18417.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 5 / 0.15" from Edge of Hole / Hoop / ebm

Acquisition date & time: 5/31/2005 3:55pm

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 30.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A -3.15219E-07 B 0.000115735 C 0.0531817 D 147.9227

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00025	159.85	1136.4	3.07	0.26697	161.83	0.780071	0.000025
5.0	0.00515	158.95	1213.7	2.79	0.26108	161.77	0.780129	0.000021
10.0	0.02517	158.55	1278.9	3.07	0.26584	161.74	0.780163	0.000026
15.0	0.05960	158.43	1041.5	2.85	0.26197	161.74	0.780167	0.000028
20.0	0.10697	159.79	998.5	3.40	0.27101	161.82	0.780080	0.000028
25.0	0.16566	162.06	915.2	3.44	0.27356	161.97	0.779920	0.000023
30.0	0.23598	160.56	1166.1	3.00	0.26641	161.87	0.780019	0.000023
35.0	0.31346	161.08	1023.2	3.11	0.26857	161.91	0.779984	0.000020
40.0	0.39773	159.35	1023.6	2.66	0.25772	161.80	0.780096	0.000023
45.0	0.48256	162.49	1172.7	3.03	0.26849	162.00	0.779883	0.000015

Fitted Delta D vs Sin^2(psi) Data:

D Spacing Intercept.....: 0.780119  
Slope of Fitted Line.....: -0.0003757  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -3.8 KSI -26.5 MPa

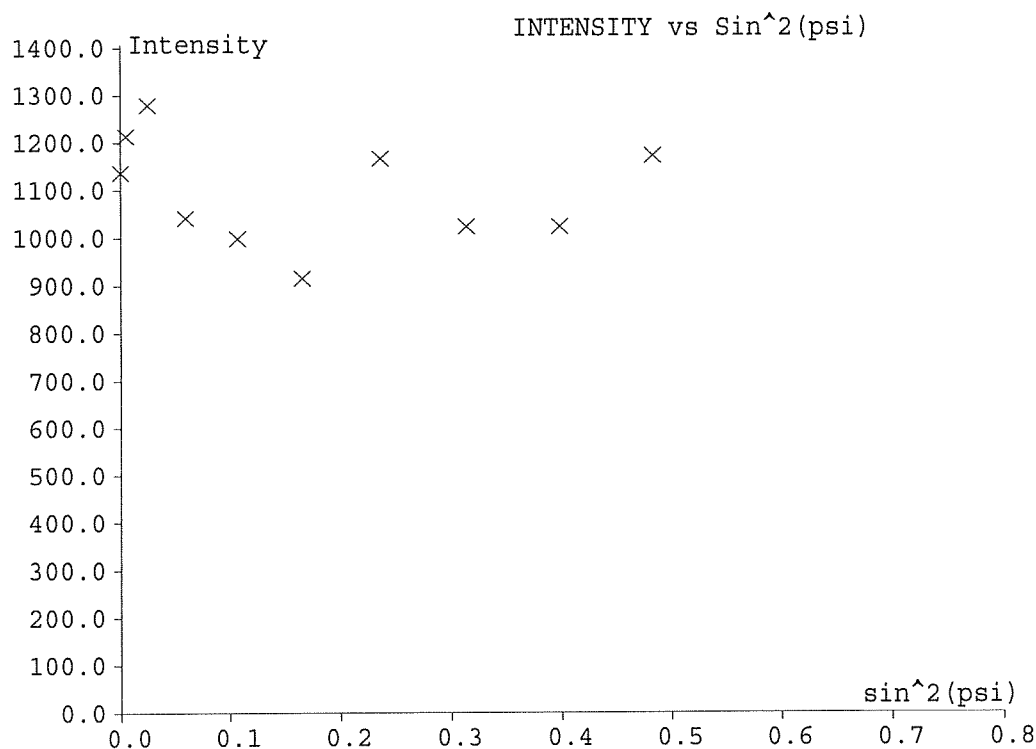
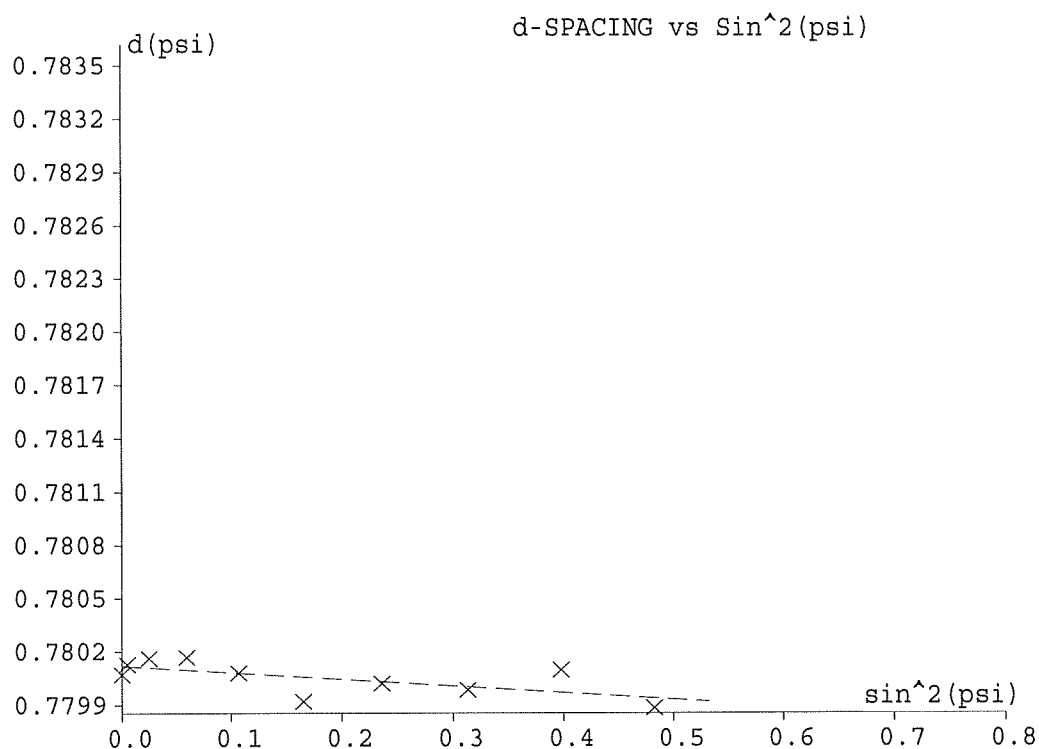
Counting Statistics Stress Error (+/-): 0.4 KSI 2.9 MPa  
Probable error.....(+/-): 1.5 KSI 10.6 MPa

File: S:\1005\2005\SBIR\50632\18417.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 5 / 0.15" from Edge of Hole / Hoop / ebm

*Residual Stress.....:	-3.8 KSI	-26.5 MPa
Counting Statistics Stress Error (+/-):	0.4 KSI	2.9 MPa
Probable error.....(+/-):	1.5 KSI	10.6 MPa



===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: S:\1005\2005\SBIR\50632\18418.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 6 / 0.05" from Edge of Hole / Hoop / ebm

Acquisition date & time: 5/31/2005 4:04pm

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 30.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A -3.15219E-07 B 0.000115735 C 0.0531817 D 147.9227

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp Cor	A	2-Theta	D Spacing	St. Dev.
0.0	0.00006	145.18	839.4	3.67	0.26051		160.86	0.781155	0.000040
5.0	0.00652	143.32	1041.3	3.33	0.25586		160.74	0.781293	0.000029
10.0	0.02740	146.47	967.7	3.38	0.25909		160.95	0.781054	0.000047
15.0	0.06215	149.28	1045.9	3.60	0.26349		161.13	0.780845	0.000029
20.0	0.11036	150.26	982.7	3.44	0.26299		161.19	0.780771	0.000034
25.0	0.16978	152.42	760.5	3.92	0.26853		161.33	0.780616	0.000086
30.0	0.23796	156.61	754.8	4.03	0.27264		161.61	0.780311	0.000095
35.0	0.31318	161.65	945.2	3.40	0.27269		161.94	0.779948	0.000037
40.0	0.39381	166.62	979.3	3.41	0.27735		162.26	0.779603	0.000035
45.0	0.47807	170.61	937.3	3.89	0.28588		162.51	0.779337	0.000034

Fitted Delta D vs Sin^2(psi) Data:

D Spacing Intercept.....: 0.781201  
Slope of Fitted Line.....: -0.003933  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -40.1 KSI -276.6 MPa

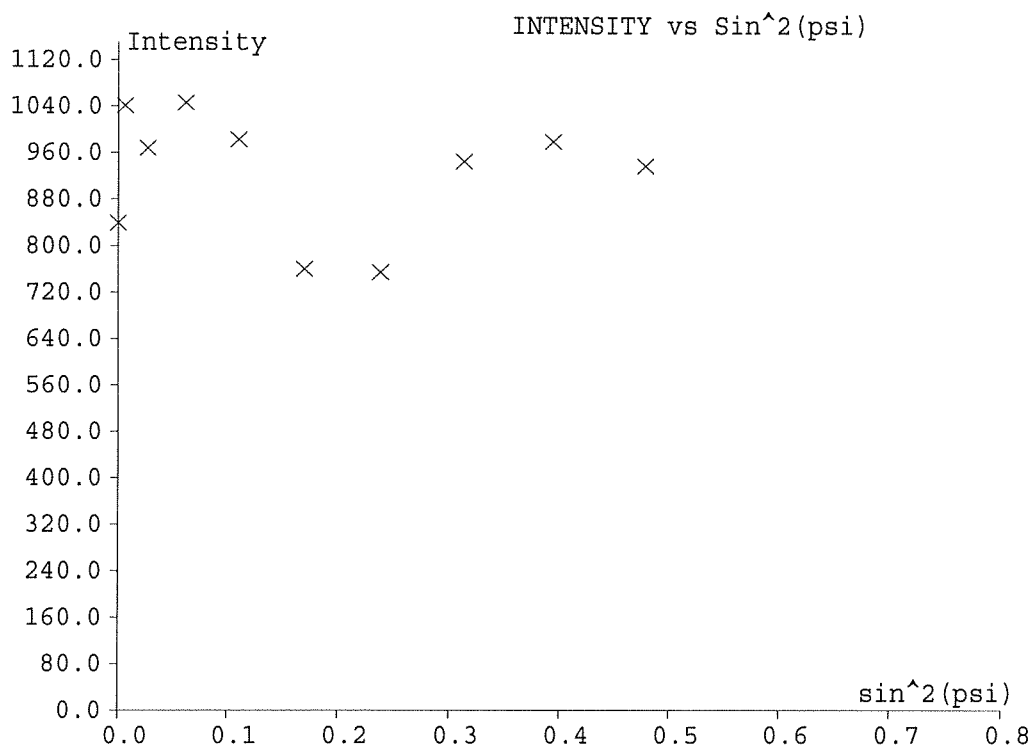
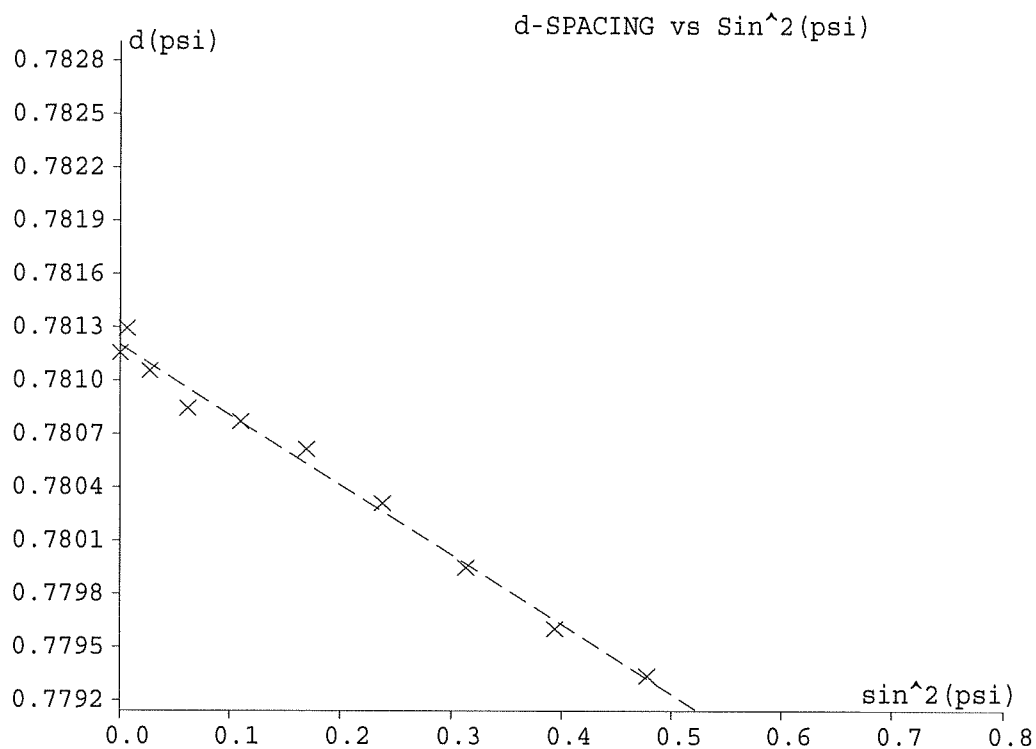
Counting Statistics Stress Error (+/-): 0.7 KSI 5.2 MPa  
Probable error.....(+/-): 1.4 KSI 10.0 MPa  
Warning: Counting statistics may be the controlling error!

File: S:\1005\2005\SBIR\50632\18418.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 6 / 0.05" from Edge of Hole / Hoop / ebm

\*Residual Stress.....: -40.1 KSI -276.6 MPa  
Counting Statistics Stress Error (+/-): 0.7 KSI 5.2 MPa  
Probable error.....(+/-): 1.4 KSI 10.0 MPa



===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: S:\1005\2005\SBIR\50632\18419.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 6 / 0.10" from Edge of Hole / Hoop / ebm

Acquisition date & time: 5/31/2005 4:15pm

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 30.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A -3.15219E-07 B 0.000115735 C 0.0531817 D 147.9227

Psi	Sin <sup>2</sup> (psi)	Pk Chan	Intens	FWHM	Kalp Cor	A 2-Theta	D Spacing	St. Dev.
0.0	0.00013	152.19	1298.1	3.33	0.26367	161.32	0.780628	0.000025
5.0	0.00603	148.73	1329.7	3.57	0.26273	161.09	0.780887	0.000030
10.0	0.02731	146.95	1166.1	3.46	0.26014	160.98	0.781019	0.000032
15.0	0.06126	152.47	1259.9	3.31	0.26369	161.34	0.780607	0.000025
20.0	0.10999	151.29	1210.8	3.42	0.26370	161.26	0.780695	0.000027
25.0	0.16802	156.50	1141.1	3.63	0.27011	161.60	0.780317	0.000036
30.0	0.23815	156.15	1127.5	3.43	0.26808	161.58	0.780340	0.000034
35.0	0.31526	157.66	1120.2	3.02	0.26445	161.68	0.780226	0.000022
40.0	0.39666	161.45	1186.9	3.31	0.27157	161.93	0.779961	0.000029
45.0	0.48053	166.18	1113.4	3.54	0.27870	162.23	0.779635	0.000036

Fitted Delta D vs Sin<sup>2</sup>(psi) Data:

D Spacing Intercept.....: 0.780852  
Slope of Fitted Line.....: -0.002335  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -23.8 KSI -164.3 MPa

Counting Statistics Stress Error (+/-): 0.6 KSI 4.2 MPa  
Probable error.....(+/-): 2.9 KSI 20.0 MPa

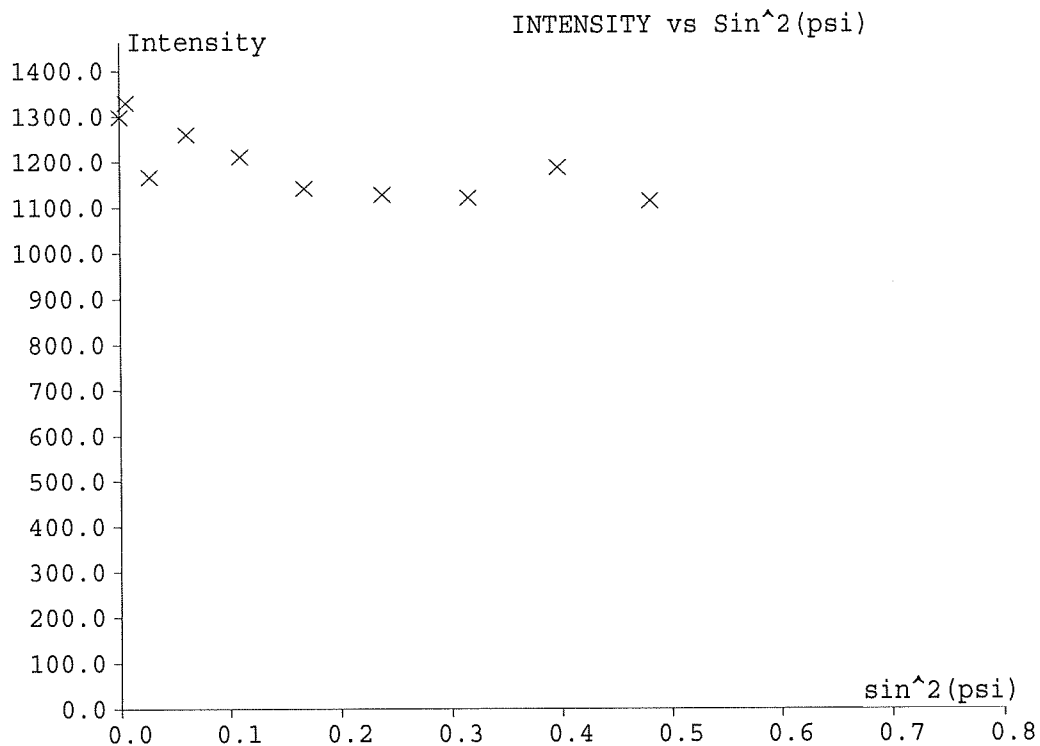
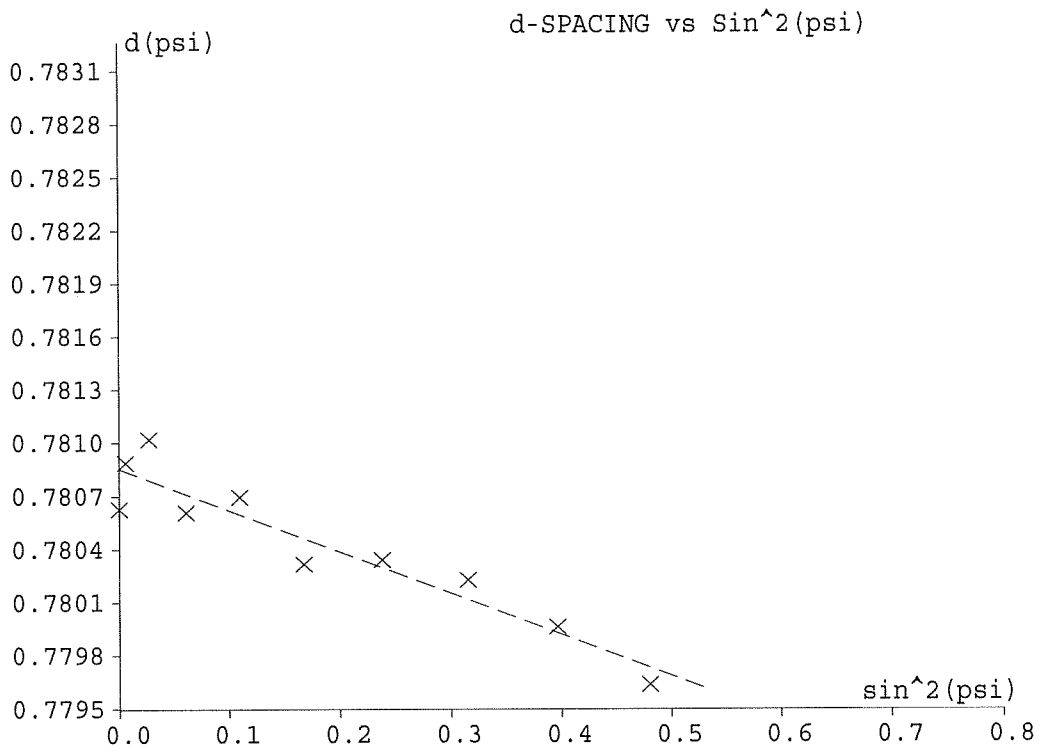


File: S:\1005\2005\SBIR\50632\18419.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 6 / 0.10" from Edge of Hole / Hoop / ebm

*Residual Stress.....:	-23.8 KSI	-164.3 MPa
Counting Statistics Stress Error (+/-):	0.6 KSI	4.2 MPa
Probable error.....(+/-):	2.9 KSI	20.0 MPa



===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: S:\1005\2005\SBIR\50632\18420.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 6 / 0.15" from Edge of Hole / Hoop / ebm

Acquisition date & time: 5/31/2005 4:23pm

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 30.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A -3.15219E-07 B 0.000115735 C 0.0531817 D 147.9227

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00018	155.56	1158.9	2.90	0.26071	161.55	0.780376	0.000024
5.0	0.00523	158.12	1269.5	3.50	0.27052	161.71	0.780199	0.000039
10.0	0.02550	156.77	1005.3	3.31	0.26747	161.62	0.780294	0.000034
15.0	0.05971	158.17	1237.3	3.40	0.26962	161.71	0.780194	0.000031
20.0	0.10887	154.38	1133.8	3.20	0.26428	161.47	0.780466	0.000024
25.0	0.16714	158.52	1006.7	3.20	0.26776	161.74	0.780167	0.000045
30.0	0.23885	154.62	980.1	2.91	0.26014	161.49	0.780444	0.000035
35.0	0.31447	159.13	1181.5	2.97	0.26484	161.78	0.780120	0.000025
40.0	0.39981	155.74	1139.2	3.00	0.26265	161.56	0.780364	0.000022
45.0	0.48524	157.82	1118.7	3.29	0.26821	161.69	0.780218	0.000021

Fitted Delta D vs Sin^2(psi) Data:

D Spacing Intercept.....: 0.780297  
Slope of Fitted Line.....: -7.035E-05  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -0.7 KSI -5.0 MPa

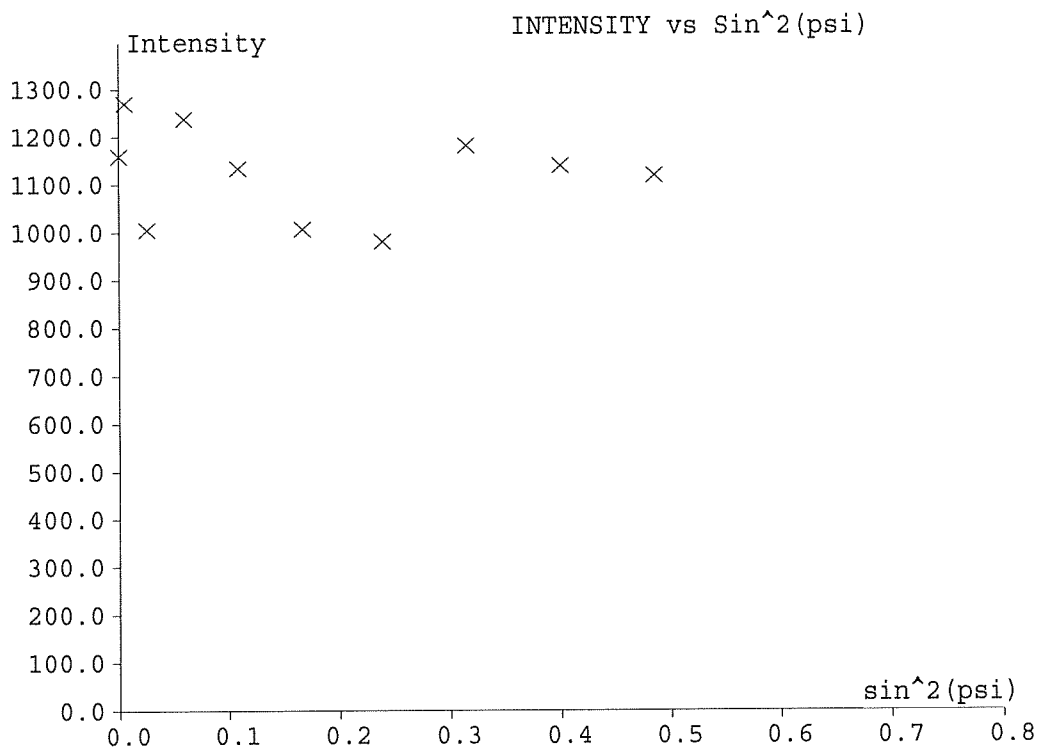
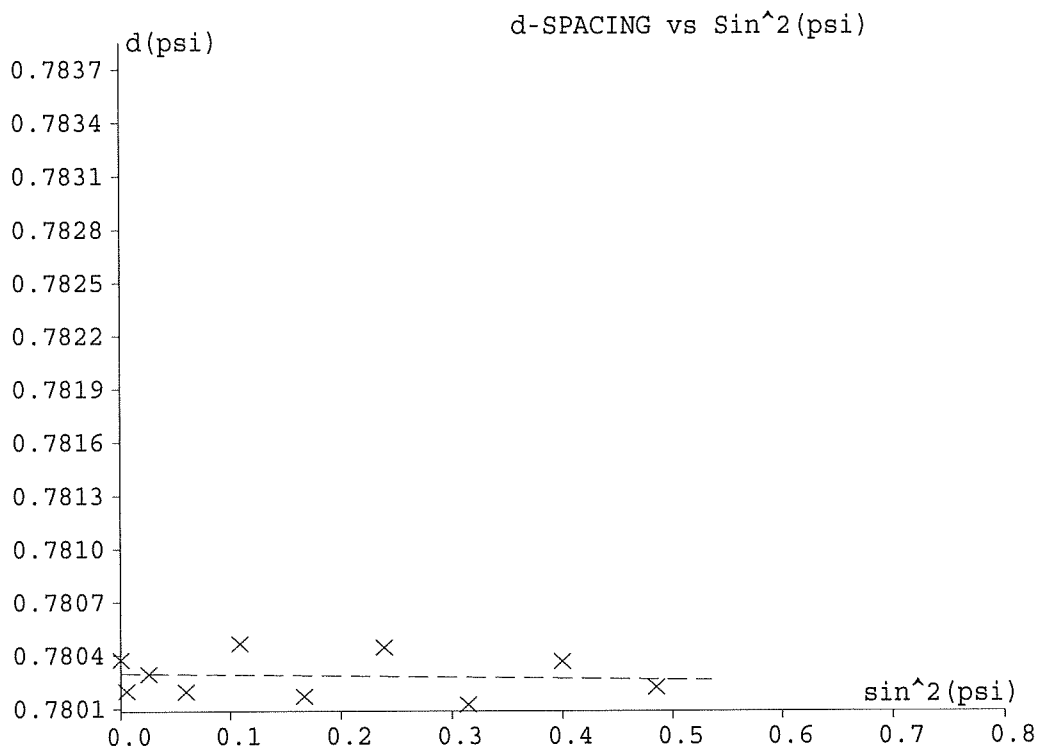
Counting Statistics Stress Error (+/-): 0.5 KSI 3.6 MPa  
Probable error.....(+/-): 2.5 KSI 17.4 MPa

File: S:\1005\2005\SBIR\50632\18420.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 6 / 0.15" from Edge of Hole / Hoop / ebm

*Residual Stress.....:	-0.7 KSI	-5.0 MPa
Counting Statistics Stress Error (+/-):	0.5 KSI	3.6 MPa
Probable error.....(+/-):	2.5 KSI	17.4 MPa



===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: S:\1005\2005\SBIR\50632\18421.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 7 / 0.05" from Edge of Hole / Hoop / ebm

Acquisition date & time: 5/31/2005 4:32pm

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 30.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A -3.15219E-07 B 0.000115735 C 0.0531817 D 147.9227

Psi	Sin <sup>2</sup> (psi)	Pk Chan	Intens	FWHM	Kalp Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00008	147.33	960.2	3.14	0.25747	161.00	0.780986	0.000031
5.0	0.00636	145.00	861.7	3.05	0.25446	160.85	0.781162	0.000028
10.0	0.02676	149.92	904.9	3.59	0.26395	161.17	0.780798	0.000041
15.0	0.06213	149.32	900.0	3.37	0.26153	161.13	0.780841	0.000029
20.0	0.11033	150.39	854.5	3.66	0.26492	161.20	0.780764	0.000049
25.0	0.17030	151.20	910.8	3.78	0.26667	161.25	0.780705	0.000033
30.0	0.23806	156.34	856.6	3.51	0.26905	161.59	0.780327	0.000046
35.0	0.31527	157.72	977.6	3.52	0.27033	161.68	0.780228	0.000029
40.0	0.39582	162.98	1102.8	3.36	0.27353	162.03	0.779854	0.000033
45.0	0.47938	168.18	953.9	3.27	0.27679	162.36	0.779495	0.000032

Fitted Delta D vs Sin<sup>2</sup>(psi) Data:

D Spacing Intercept.....: 0.781063  
Slope of Fitted Line.....: -0.003029  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -30.9 KSI -213.1 MPa

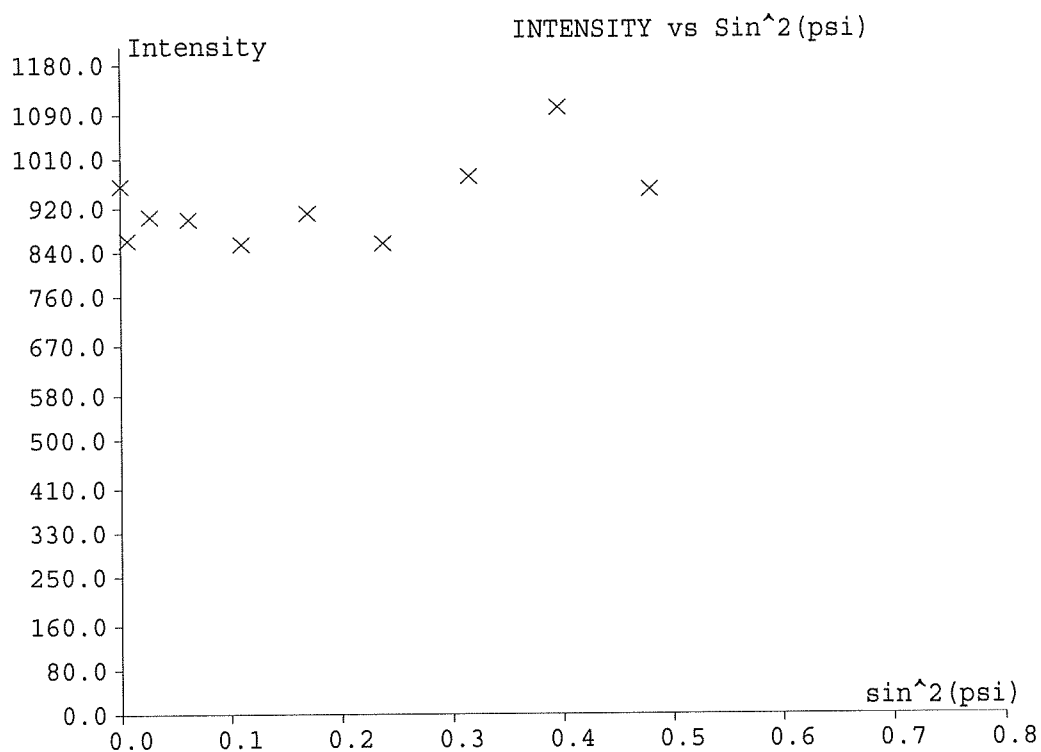
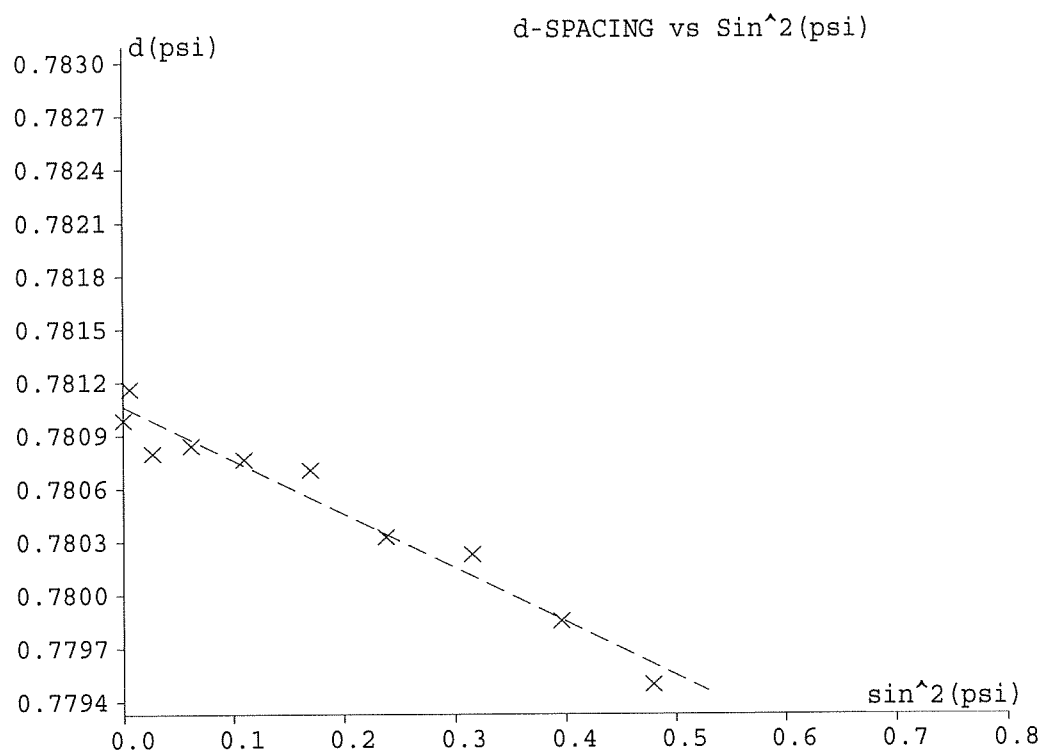
Counting Statistics Stress Error (+/-): 0.6 KSI 4.5 MPa  
Probable error.....(+/-): 2.3 KSI 16.0 MPa

File: S:\1005\2005\SBIR\50632\18421.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 7 / 0.05" from Edge of Hole / Hoop / ebm

\*Residual Stress.....: -30.9 KSI -213.1 MPa  
Counting Statistics Stress Error (+/-): 0.6 KSI 4.5 MPa  
Probable error.....(+/-): 2.3 KSI 16.0 MPa



===== TEC Stress Analyzer v1.64 =====  
 ===== Residual Stress Analysis Report =====

File: S:\1005\2005\SBIR\50632\18422.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 7 / 0.10" from Edge of Hole / Hoop / ebm

Acquisition date & time: 5/31/2005 4:39pm

Material [hkl].....: Al 5083-H23 [333]  
 Depth.....: 0.0000000  
 Phi angle.....: 0.00  
 Collimator.....: Round\_4mm  
 Bracket.....: 160s  
 Peak Bounding Range [percent].....: 20  
 X-ray Target Description and Wavelength: copper 1.54056  
 PSI Oscillation Angle Range.....: 2.00  
 Spectra count time (PSI=0).....: 30.0  
 High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
 ADC Channels Full Scale.....: 256  
 Detector Calibration Coefficients:  
 A -3.15219E-07 B 0.000115735 C 0.0531817 D 147.9227

Psi	Sin <sup>2</sup> (psi)	Pk Chan	Intens	FWHM	Kalp Cor	A	2-Theta	D Spacing	St. Dev.
0.0	0.00009	149.00	1357.3	3.53	0.26262		161.11	0.780866	0.000030
5.0	0.00606	148.42	1293.1	3.47	0.26155		161.07	0.780908	0.000032
10.0	0.02613	153.30	1204.7	3.35	0.26478		161.40	0.780546	0.000036
15.0	0.06144	151.73	1080.2	2.93	0.25833		161.30	0.780656	0.000022
20.0	0.10842	155.71	1166.9	3.60	0.26914		161.55	0.780373	0.000038
25.0	0.16969	152.57	1058.7	3.28	0.26352		161.35	0.780599	0.000030
30.0	0.23806	156.30	1060.1	3.17	0.26550		161.59	0.780326	0.000024
35.0	0.31616	156.03	1142.5	3.46	0.26828		161.57	0.780349	0.000036
40.0	0.39819	158.63	1279.6	2.97	0.26453		161.75	0.780156	0.000019
45.0	0.48215	163.24	1066.6	3.17	0.27118		162.05	0.779833	0.000030

Fitted Delta D vs Sin<sup>2</sup>(psi) Data:

D Spacing Intercept.....: 0.780774  
 Slope of Fitted Line.....: -0.001731  
 Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -17.7 KSI -121.8 MPa

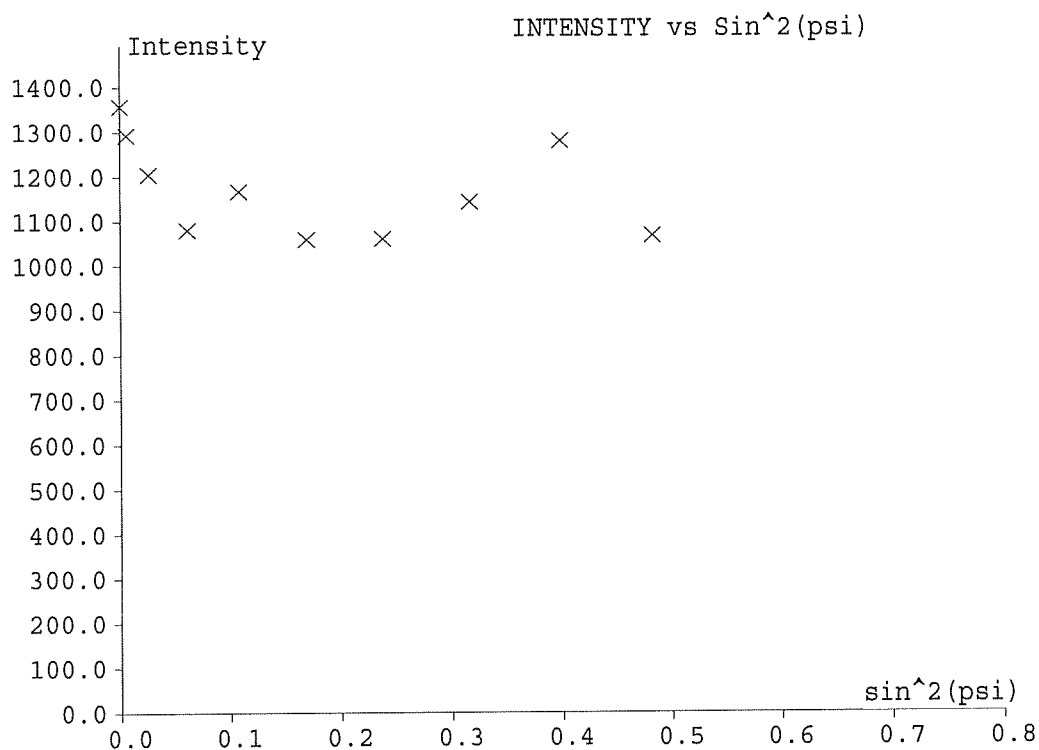
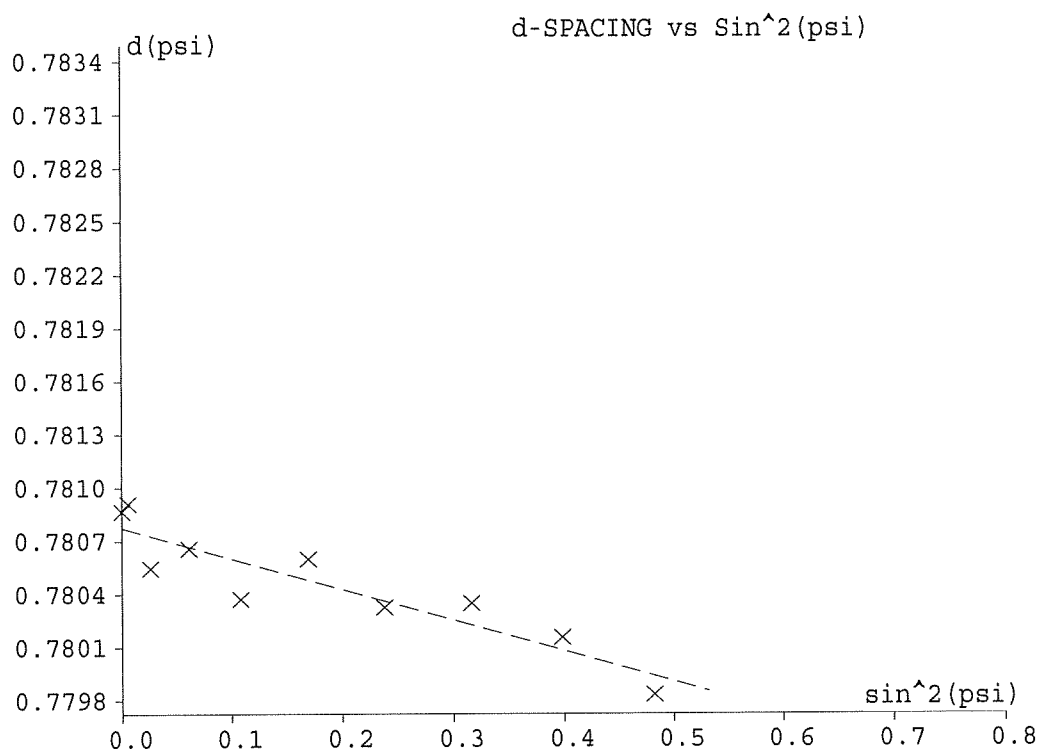
Counting Statistics Stress Error (+/-): 0.6 KSI 4.0 MPa  
 Probable error.....(+/-): 2.8 KSI 19.0 MPa

File: S:\1005\2005\SBIR\50632\18422.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 7 / 0.10" from Edge of Hole / Hoop / ebm

*Residual Stress.....:	-17.7 KSI	-121.8 MPa
Counting Statistics Stress Error (+/-):	0.6 KSI	4.0 MPa
Probable error.....(+/-):	2.8 KSI	19.0 MPa



===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: S:\1005\2005\SBIR\50632\18423.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 7 / 0.15" from Edge of Hole / Hoop / ebm

Acquisition date & time: 5/31/2005 4:52pm

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 30.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A -3.15219E-07 B 0.000115735 C 0.0531817 D 147.9227

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp Cor	A	2-Theta	D Spacing	St. Dev.
0.0	0.00018	155.70	1437.6	3.35	0.26690		161.55	0.780372	0.000029
5.0	0.00570	152.50	1225.7	3.31	0.26373		161.34	0.780604	0.000032
10.0	0.02627	152.53	1121.5	3.19	0.26257		161.35	0.780601	0.000024
15.0	0.06107	153.09	1215.6	3.01	0.26051		161.38	0.780557	0.000025
20.0	0.10872	154.84	1258.3	3.34	0.26610		161.50	0.780434	0.000025
25.0	0.16922	153.64	1100.9	3.23	0.26394		161.42	0.780520	0.000024
30.0	0.23949	153.33	985.0	3.02	0.26092		161.40	0.780540	0.000019
35.0	0.31565	156.96	989.9	3.20	0.26642		161.64	0.780279	0.000031
40.0	0.39825	158.56	1166.5	3.12	0.26664		161.74	0.780163	0.000024
45.0	0.48577	156.86	1096.8	3.10	0.26487		161.63	0.780285	0.000029

Fitted Delta D vs Sin^2(psi) Data:

D Spacing Intercept.....: 0.780556  
Slope of Fitted Line.....: -0.000667  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -6.8 KSI -46.9 MPa

Counting Statistics Stress Error (+/-): 0.5 KSI 3.8 MPa  
Probable error.....(+/-): 2.1 KSI 14.8 MPa

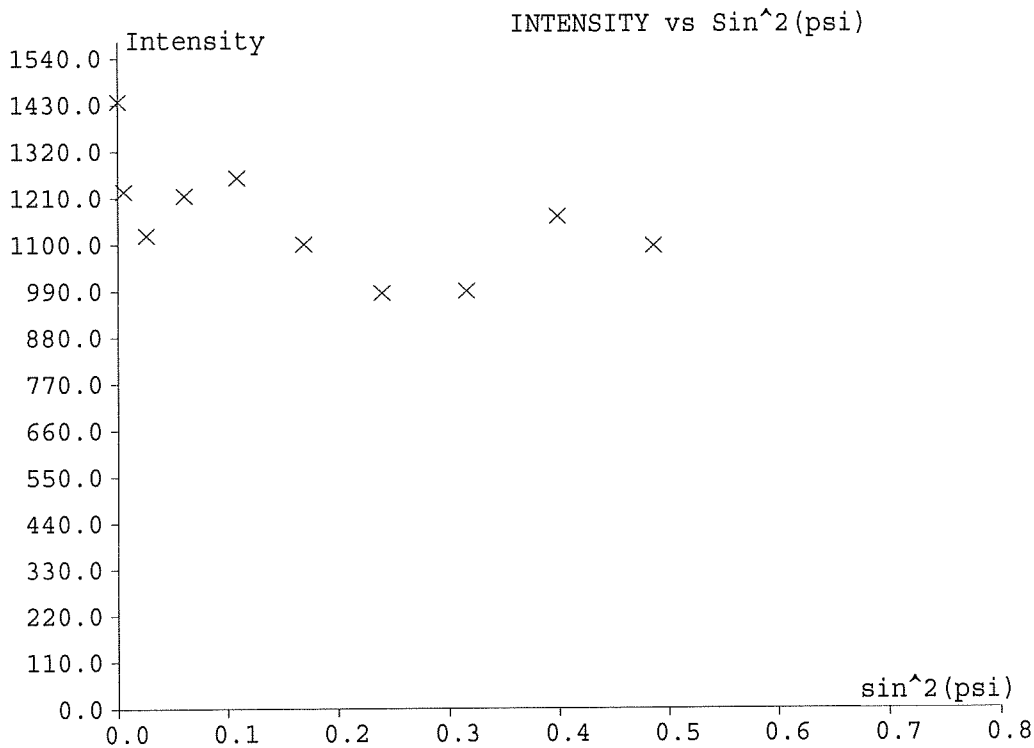
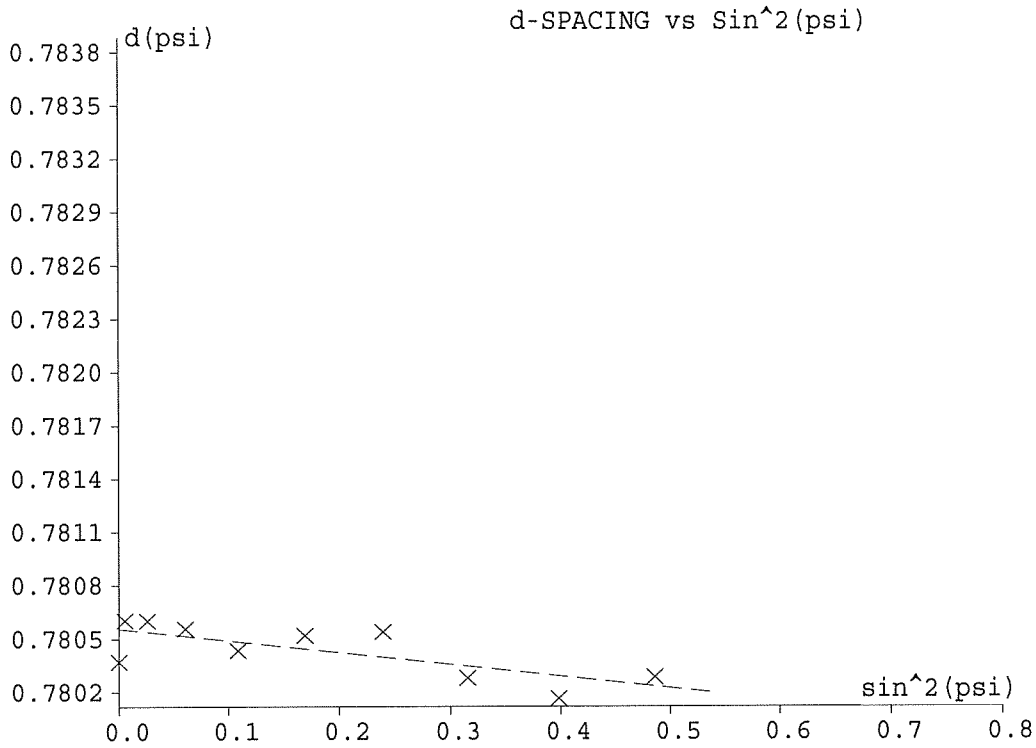


File: S:\1005\2005\SBIR\50632\18423.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 7 / 0.15" from Edge of Hole / Hoop / ebm

*Residual Stress.....:	-6.8 KSI	-46.9 MPa
Counting Statistics Stress Error (+/-):	0.5 KSI	3.8 MPa
Probable error.....(+/-):	2.1 KSI	14.8 MPa



===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: S:\1005\2005\SBIR\50632\18424.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 8 / 0.05" from Edge of Hole / Hoop / ebm

Acquisition date & time: 5/31/2005 5:00pm

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 30.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A -3.15219E-07 B 0.000115735 C 0.0531817 D 147.9227

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00009	148.61	1056.9	3.23	0.25960	161.09	0.780892	0.000029
5.0	0.00609	148.00	1108.5	3.43	0.26087	161.05	0.780940	0.000032
10.0	0.02648	151.36	1024.8	3.33	0.26297	161.27	0.780688	0.000029
15.0	0.06220	149.02	918.6	3.14	0.25892	161.12	0.780860	0.000025
20.0	0.10827	156.10	885.4	3.36	0.26739	161.58	0.780343	0.000048
25.0	0.16882	154.60	1044.7	3.41	0.26648	161.48	0.780452	0.000029
30.0	0.23826	155.94	981.8	3.52	0.26876	161.57	0.780356	0.000038
35.0	0.31273	162.52	999.6	3.44	0.27400	162.00	0.779887	0.000033
40.0	0.39576	163.10	1109.3	3.49	0.27510	162.03	0.779847	0.000033
45.0	0.48014	166.84	999.3	3.35	0.27678	162.28	0.779587	0.000034

Fitted Delta D vs Sin^2(psi) Data:

D Spacing Intercept.....: 0.780872  
Slope of Fitted Line.....: -0.002704  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -27.6 KSI -190.2 MPa

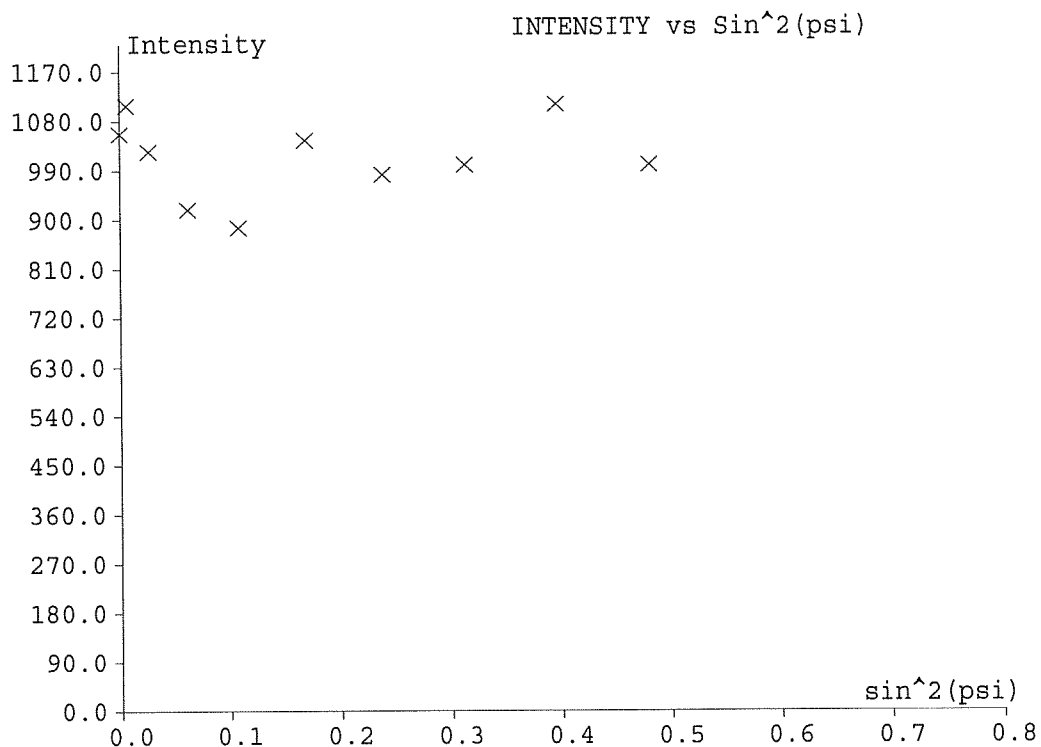
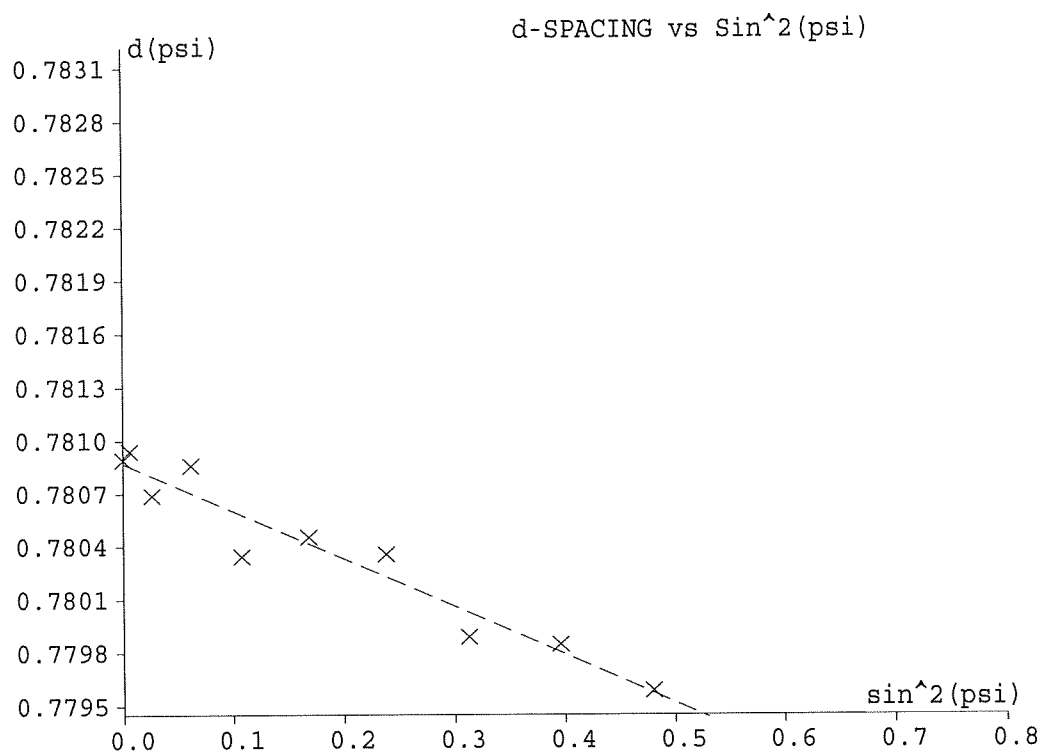
Counting Statistics Stress Error (+/-): 0.6 KSI 4.5 MPa  
Probable error.....(+/-): 2.6 KSI 18.1 MPa

File: S:\1005\2005\SBIR\50632\18424.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 8 / 0.05" from Edge of Hole / Hoop / ebm

*Residual Stress.....:	-27.6 KSI	-190.2 MPa
Counting Statistics Stress Error (+/-):	0.6 KSI	4.5 MPa
Probable error.....(+/-):	2.6 KSI	18.1 MPa



===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: S:\1005\2005\SBIR\50632\18425.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 8 / 0.10" from Edge of Hole / Hoop / ebm

Acquisition date & time: 6/01/2005 9:27am

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 30.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A -3.15219E-07 B 0.000115735 C 0.0531817 D 147.9227

Psi	Sin <sup>2</sup> (psi)	Pk Chan	Intens	FWHM	Kalp Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00012	151.05	1444.1	3.32	0.26258	161.25	0.780711	0.000029
5.0	0.00585	150.66	1451.4	3.10	0.25972	161.22	0.780738	0.000021
10.0	0.02653	151.05	1187.3	3.00	0.25878	161.25	0.780707	0.000034
15.0	0.06135	152.11	1253.7	3.17	0.26196	161.32	0.780632	0.000024
20.0	0.10883	154.51	995.9	3.27	0.26508	161.48	0.780457	0.000027
25.0	0.16913	153.86	1032.6	3.21	0.26387	161.43	0.780504	0.000030
30.0	0.23777	156.91	955.6	3.27	0.26720	161.63	0.780284	0.000033
35.0	0.31460	158.91	1186.9	3.07	0.26622	161.77	0.780137	0.000032
40.0	0.39664	161.43	1197.1	3.05	0.26795	161.93	0.779959	0.000031
45.0	0.48370	160.46	1129.0	2.96	0.26573	161.87	0.780025	0.000028

Fitted Delta D vs Sin<sup>2</sup>(psi) Data:

D Spacing Intercept.....: 0.780718  
Slope of Fitted Line.....: -0.001676  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -17.1 KSI -118.0 MPa

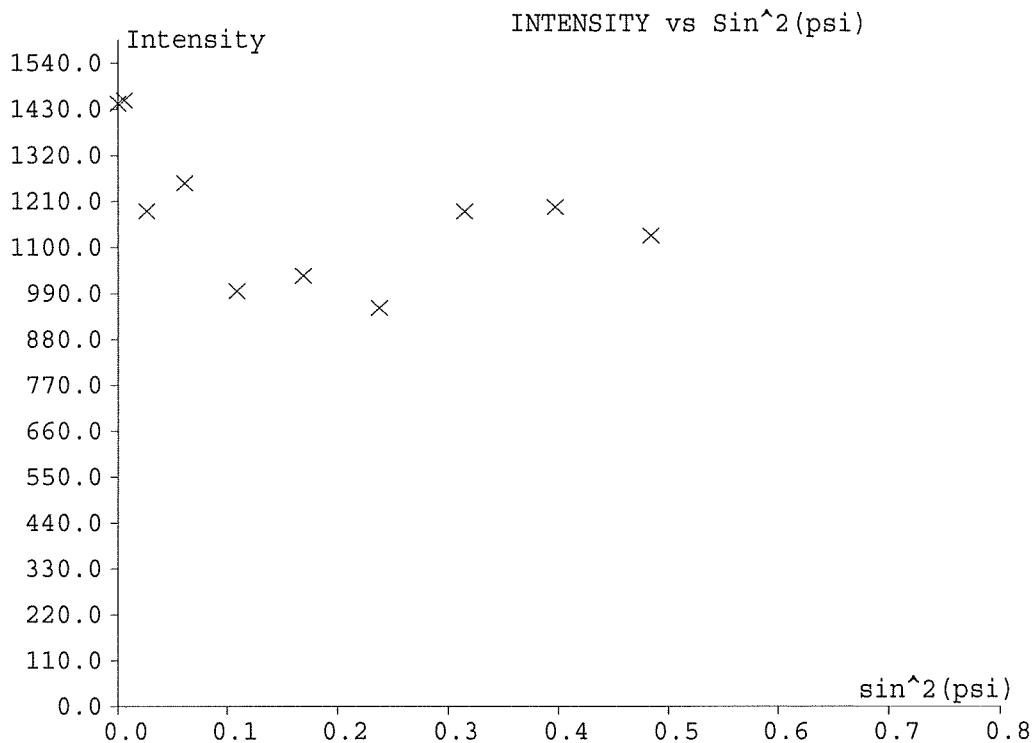
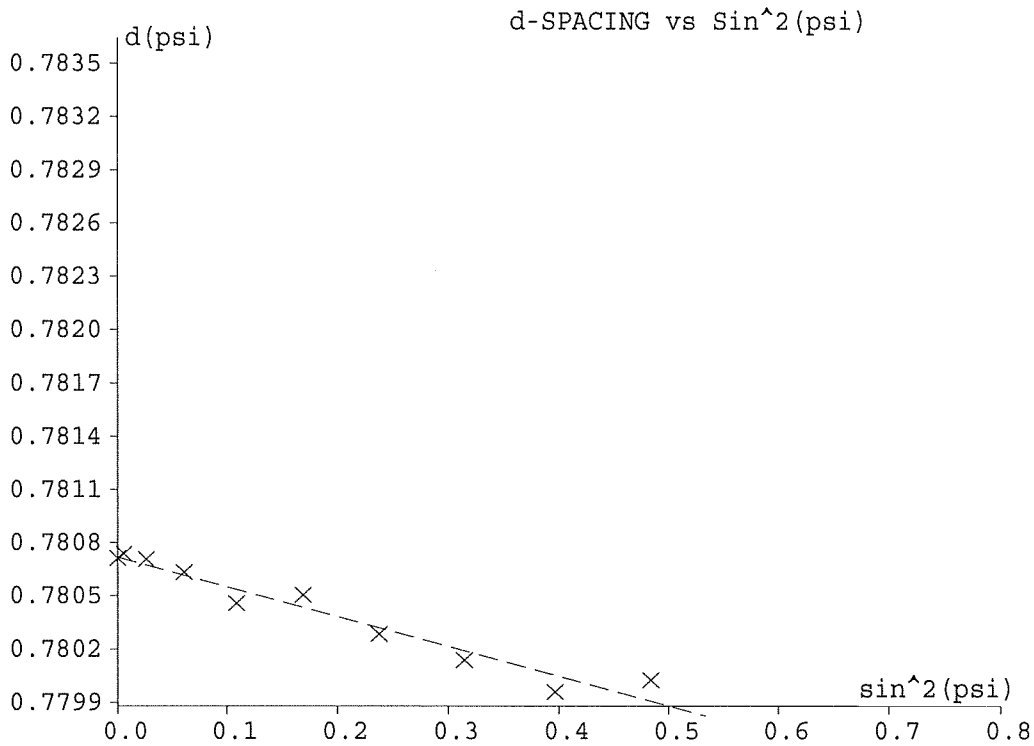
Counting Statistics Stress Error (+/-): 0.6 KSI 3.9 MPa  
Probable error.....(+/-): 1.4 KSI 9.7 MPa

File: S:\1005\2005\SBIR\50632\18425.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 8 / 0.10" from Edge of Hole / Hoop / ebm

*Residual Stress.....:	-17.1 KSI	-118.0 MPa
Counting Statistics Stress Error (+/-):	0.6 KSI	3.9 MPa
Probable error.....(+/-):	1.4 KSI	9.7 MPa



===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: S:\1005\2005\SBIR\50632\18426.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 8 / 0.15" from Edge of Hole / Hoop / ebm

Acquisition date & time: 6/01/2005 10:32am

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 30.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A -3.15219E-07 B 0.000115735 C 0.0531817 D 147.9227

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00015	153.53	1261.0	2.75	0.25634	161.42	0.780520	0.000018
5.0	0.00558	153.77	1373.0	3.06	0.26180	161.43	0.780508	0.000025
10.0	0.02600	153.89	1424.4	2.84	0.25835	161.44	0.780495	0.000022
15.0	0.06093	153.57	1157.5	2.89	0.25897	161.42	0.780520	0.000024
20.0	0.10867	154.96	1084.9	3.27	0.26553	161.50	0.780425	0.000027
25.0	0.16872	154.82	1038.0	3.26	0.26530	161.50	0.780435	0.000029
30.0	0.23933	153.64	915.3	2.92	0.25952	161.42	0.780515	0.000021
35.0	0.31506	158.05	1160.1	3.14	0.26653	161.71	0.780200	0.000024
40.0	0.39936	156.60	1082.0	3.25	0.26677	161.61	0.780306	0.000023
45.0	0.48491	158.35	1229.9	3.02	0.26504	161.73	0.780176	0.000024

Fitted Delta D vs Sin^2(psi) Data:

D Spacing Intercept.....: 0.780532  
Slope of Fitted Line.....: -0.0006723  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -6.9 KSI -47.3 MPa

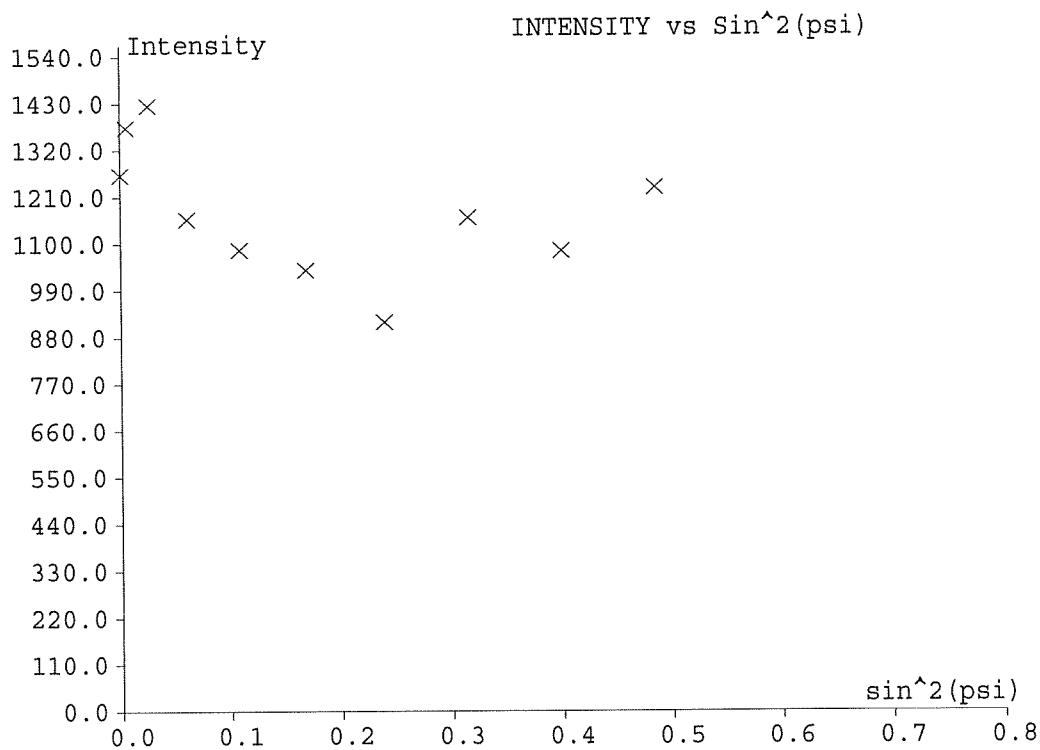
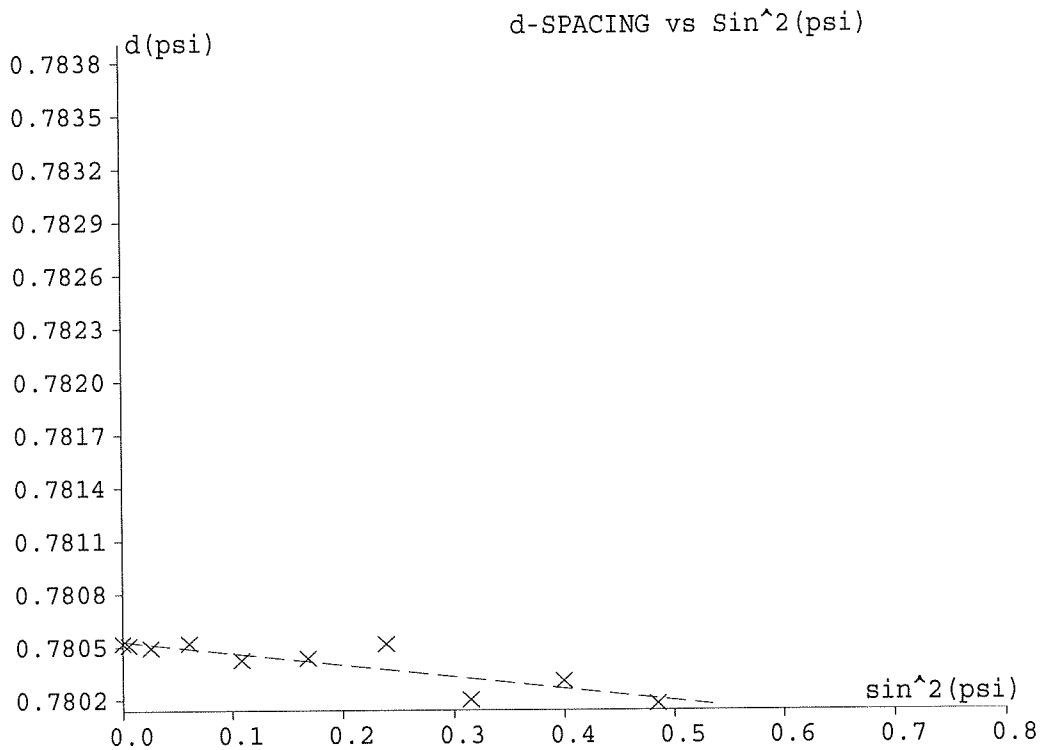
Counting Statistics Stress Error (+/-): 0.5 KSI 3.1 MPa  
Probable error.....(+/-): 1.4 KSI 9.7 MPa

File: S:\1005\2005\SBIR\50632\18426.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 8 / 0.15" from Edge of Hole / Hoop / ebm

*Residual Stress.....:	-6.9 KSI	-47.3 MPa
Counting Statistics Stress Error (+/-):	0.5 KSI	3.1 MPa
Probable error.....(+/-):	1.4 KSI	9.7 MPa



===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: S:\1005\2005\SBIR\50632\18427.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 9 / 0.05" from Edge of Hole / Hoop / ebm

Acquisition date & time: 6/01/2005 10:41am

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 30.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A -3.15219E-07 B 0.000115735 C 0.0531817 D 147.9227

Psi	Sin <sup>2</sup> (psi)	Pk Chan	Intens	FWHM	Kalp	Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00009	148.72	1018.3	3.27	0.26009		161.09	0.780884	0.000032
5.0	0.00606	148.37	978.6	3.40	0.26090		161.07	0.780912	0.000032
10.0	0.02682	149.46	1016.1	2.90	0.25587		161.15	0.780824	0.000024
15.0	0.06184	150.38	899.9	3.45	0.26318		161.20	0.780762	0.000038
20.0	0.10994	151.44	958.0	3.58	0.26527		161.27	0.780685	0.000039
25.0	0.16864	155.06	921.6	3.65	0.26898		161.51	0.780421	0.000036
30.0	0.23779	156.86	972.7	3.27	0.26713		161.63	0.780287	0.000029
35.0	0.31202	163.91	864.0	3.59	0.27685		162.08	0.779792	0.000050
40.0	0.39467	165.09	1218.5	3.52	0.27737		162.16	0.779710	0.000026
45.0	0.47999	167.13	1038.2	3.48	0.27884		162.29	0.779569	0.000036

Fitted Delta D vs Sin<sup>2</sup>(psi) Data:

D Spacing Intercept.....: 0.780926  
Slope of Fitted Line.....: -0.003009  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -30.7 KSI -211.7 MPa

Counting Statistics Stress Error (+/-): 0.7 KSI 4.6 MPa  
Probable error.....(+/-): 1.8 KSI 12.2 MPa

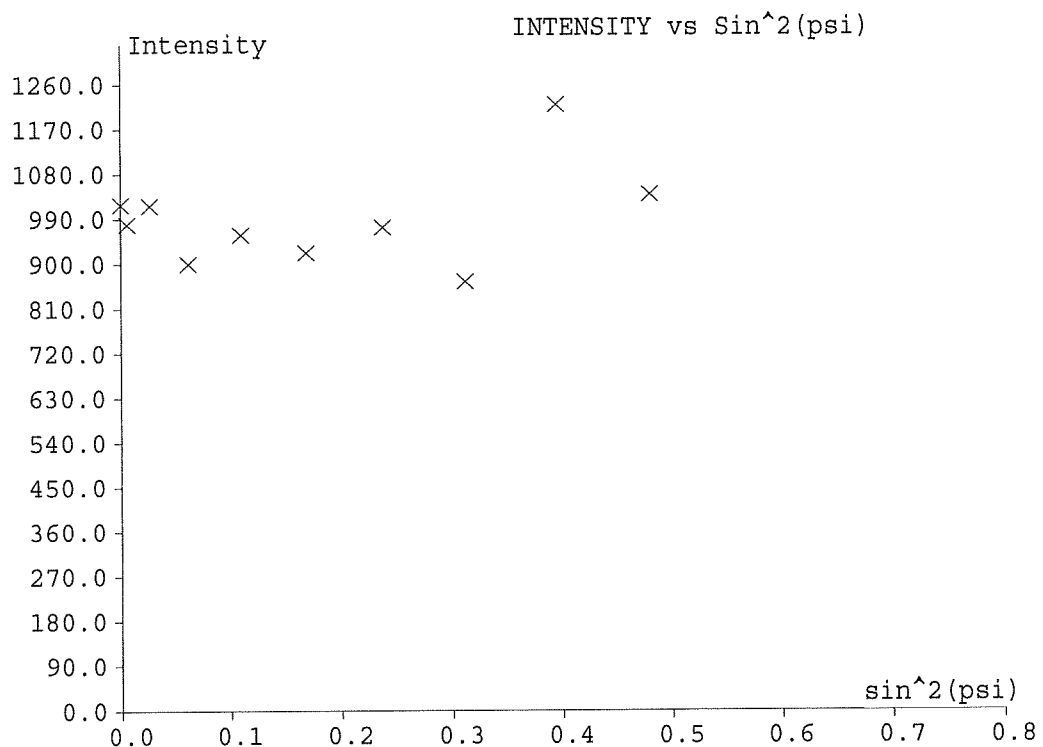
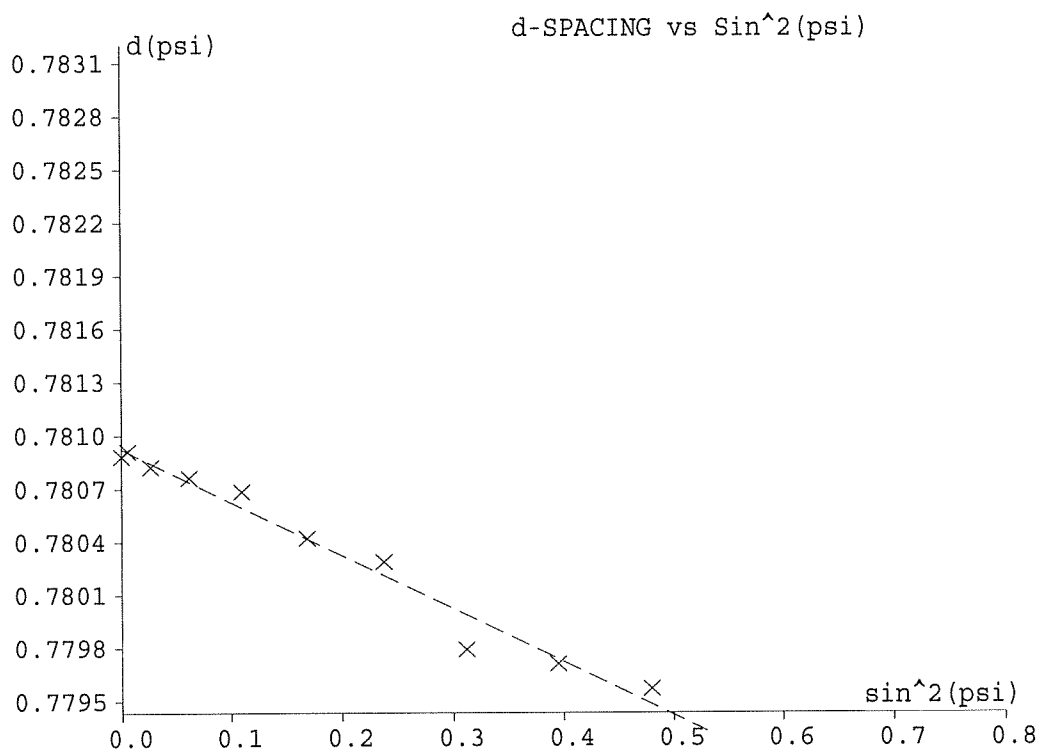


File: S:\1005\2005\SBIR\50632\18427.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 9 / 0.05" from Edge of Hole / Hoop / ebm

*Residual Stress.....:	-30.7 KSI	-211.7 MPa
Counting Statistics Stress Error (+/-):	0.7 KSI	4.6 MPa
Probable error.....(+/-):	1.8 KSI	12.2 MPa



===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2005\SBIR\50632\18428.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 9 / 0.10" from Edge of Hole / Hoop / ebm

Acquisition date & time: 6/01/2005 11:01am

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 30.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A -3.15219E-07 B 0.000115735 C 0.0531817 D 147.9227

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00012	151.20	1402.5	3.46	0.26400	161.26	0.780702	0.000026
5.0	0.00567	152.85	1195.4	3.19	0.26275	161.37	0.780578	0.000025
10.0	0.02627	152.45	1321.4	2.99	0.25981	161.34	0.780604	0.000022
15.0	0.06133	152.20	1142.9	3.44	0.26464	161.32	0.780628	0.000025
20.0	0.10975	151.95	1111.4	3.40	0.26411	161.31	0.780646	0.000028
25.0	0.16746	157.82	1097.9	3.49	0.27020	161.69	0.780221	0.000031
30.0	0.23818	156.00	1067.1	2.93	0.26158	161.58	0.780344	0.000022
35.0	0.31330	161.43	995.7	3.32	0.27160	161.93	0.779963	0.000031
40.0	0.39720	160.37	1322.4	2.88	0.26409	161.86	0.780030	0.000018
45.0	0.48276	162.20	1221.9	3.33	0.27243	161.98	0.779909	0.000023

Fitted Delta D vs Sin^2(psi) Data:

D Spacing Intercept.....: 0.780667  
Slope of Fitted Line.....: -0.001692  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -17.3 KSI -119.1 MPa

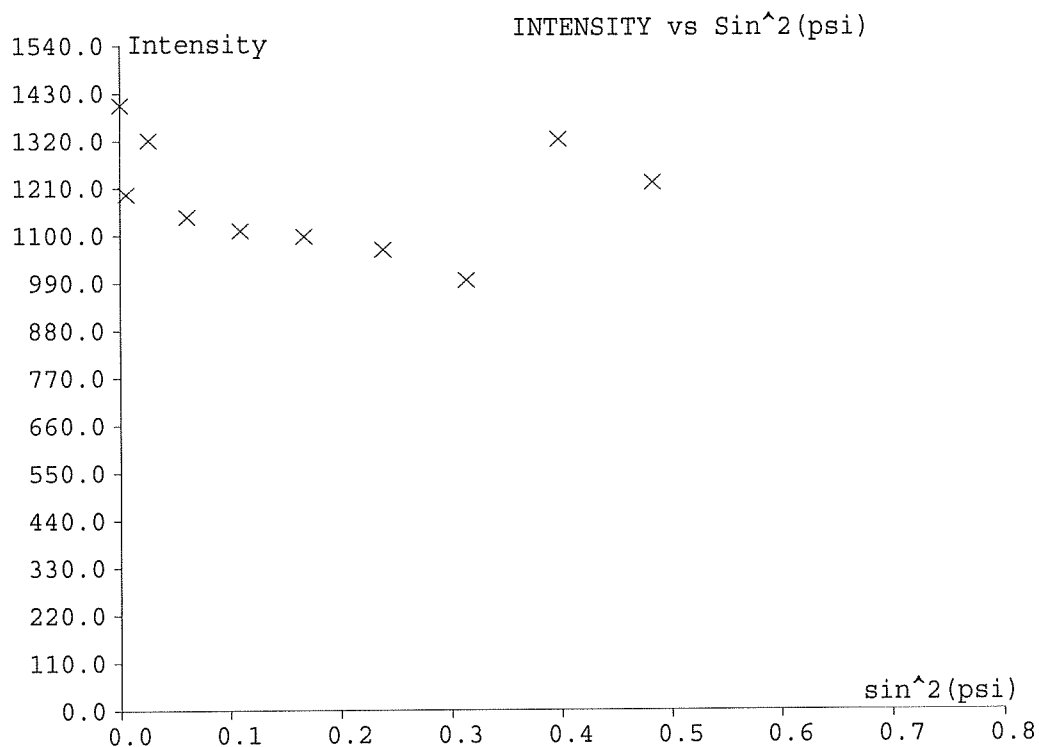
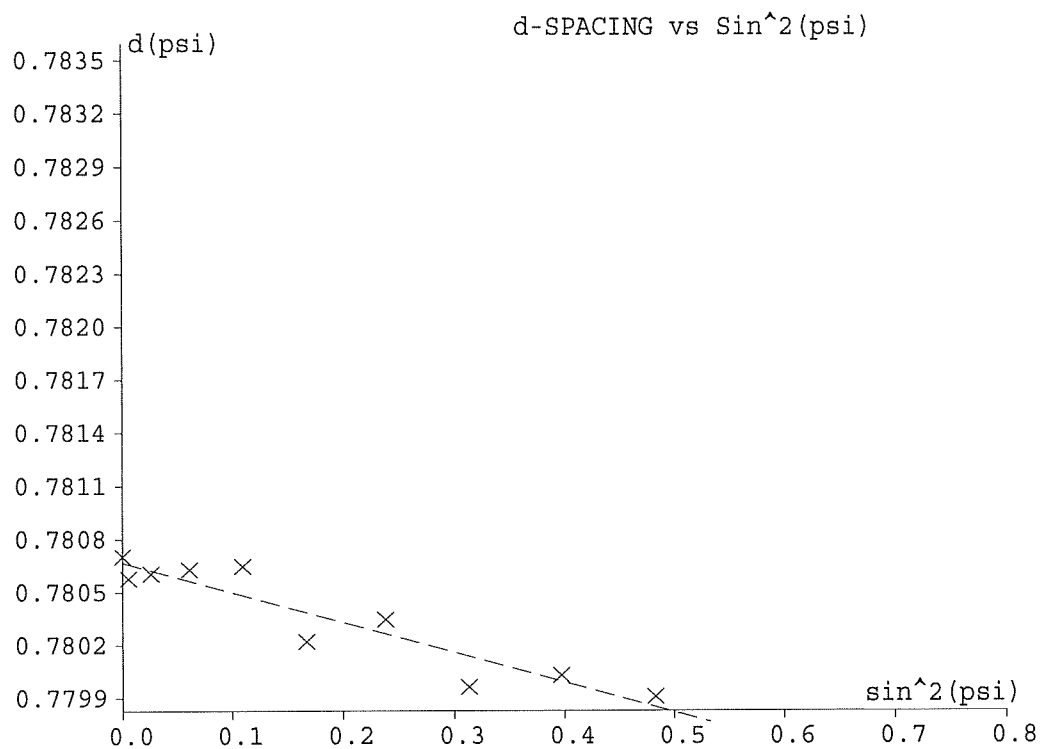
Counting Statistics Stress Error (+/-): 0.5 KSI 3.2 MPa  
Probable error.....(+/-): 2.3 KSI 15.8 MPa

File: C:\STRESS\DATA\2005\SBIR\50632\18428.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 9 / 0.10" from Edge of Hole / Hoop / ebm

*Residual Stress.....:	-17.3 KSI	-119.1 MPa
Counting Statistics Stress Error (+/-):	0.5 KSI	3.2 MPa
Probable error.....(+/-):	2.3 KSI	15.8 MPa



===== TEC Stress Analyzer v1.64 =====  
 ===== Residual Stress Analysis Report =====

File: S:\1005\2005\SBIR\50632\18429.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 9 / 0.15" from Edge of Hole / Hoop / ebm

Acquisition date & time: 6/01/2005 11:12am

Material [hkl].....: Al 5083-H23 [333]  
 Depth.....: 0.0000000  
 Phi angle.....: 0.00  
 Collimator.....: Round\_4mm  
 Bracket.....: 160s  
 Peak Bounding Range [percent].....: 20  
 X-ray Target Description and Wavelength: copper 1.54056  
 PSI Oscillation Angle Range.....: 2.00  
 Spectra count time (PSI=0).....: 30.0  
 High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
 ADC Channels Full Scale.....: 256  
 Detector Calibration Coefficients:  
 A -3.15219E-07 B 0.000115735 C 0.0531817 D 147.9227

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp Cor	A	2-Theta	D Spacing	St. Dev.
0.0	0.00019	156.17	1303.6	3.15	0.26502		161.58	0.780335	0.000022
5.0	0.00534	156.79	1356.1	3.43	0.26865		161.62	0.780294	0.000027
10.0	0.02584	154.90	1338.9	3.37	0.26638		161.50	0.780430	0.000031
15.0	0.06016	156.36	1197.3	2.81	0.25950		161.60	0.780315	0.000023
20.0	0.10846	155.46	1064.2	2.88	0.26029		161.54	0.780382	0.000028
25.0	0.16643	160.21	1003.4	3.33	0.27069		161.85	0.780049	0.000059
30.0	0.23607	160.40	912.8	3.16	0.26868		161.86	0.780033	0.000038
35.0	0.31524	157.62	1126.2	2.76	0.25964		161.69	0.780224	0.000018
40.0	0.39719	160.36	1349.7	2.77	0.26171		161.87	0.780028	0.000021
45.0	0.48433	159.41	1239.8	3.19	0.26837		161.80	0.780104	0.000021

Fitted Delta D vs Sin^2(psi) Data:

D Spacing Intercept.....: 0.780336  
 Slope of Fitted Line.....: -0.0006498  
 Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -6.6 KSI -45.7 MPa

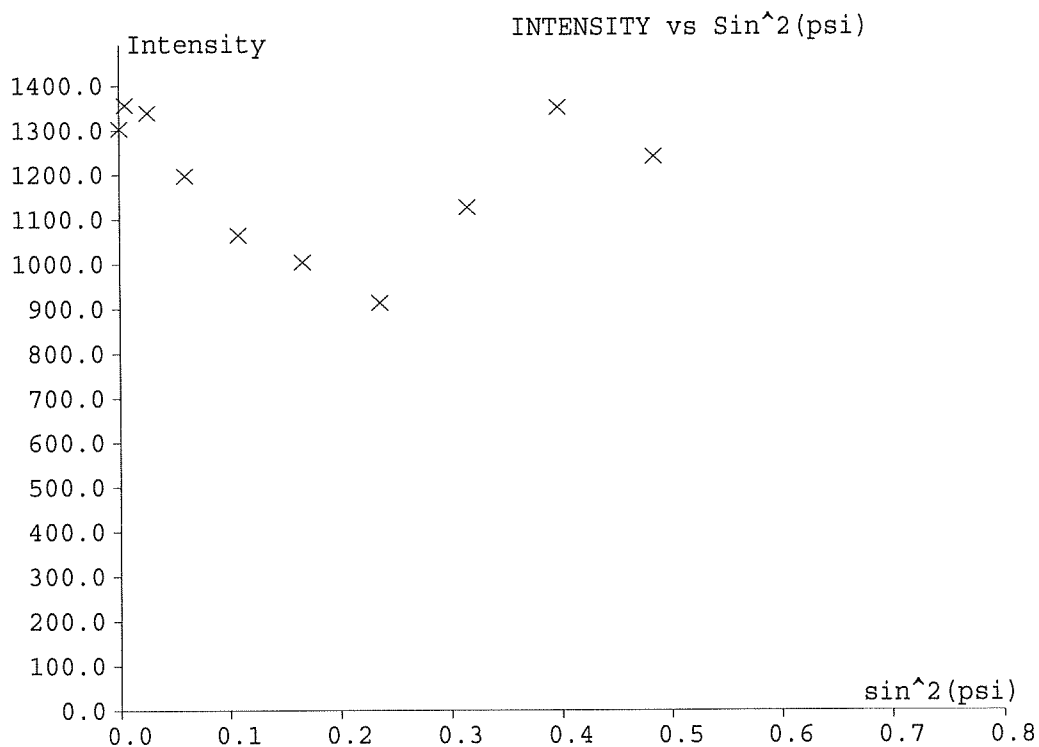
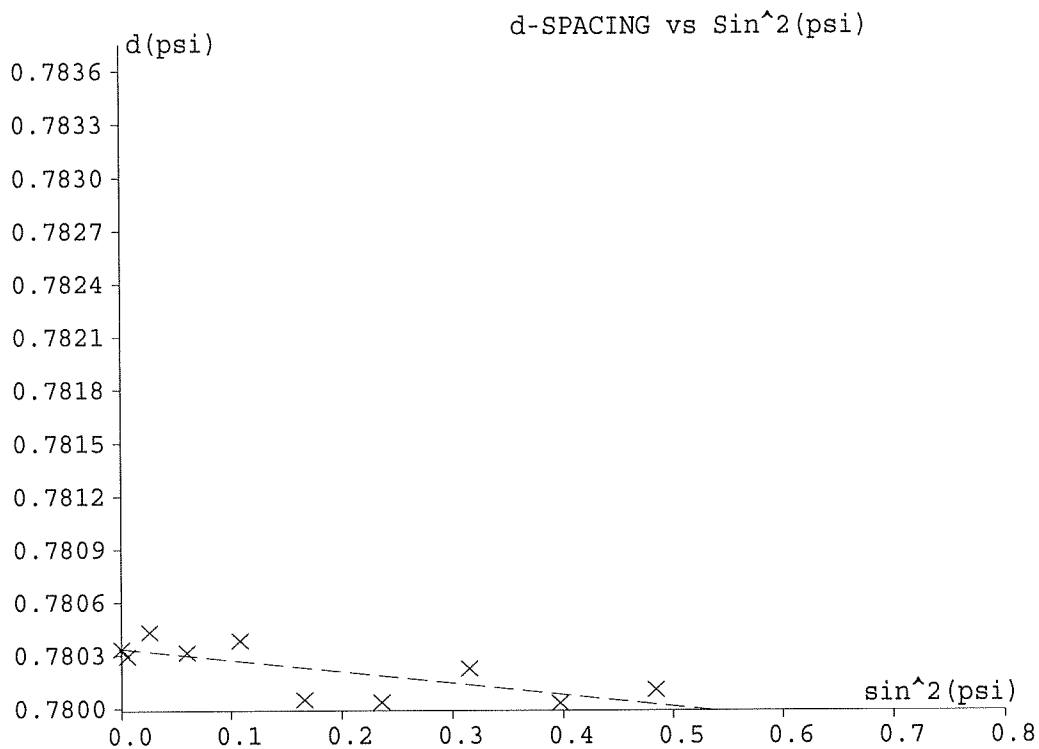
Counting Statistics Stress Error (+/-): 0.5 KSI 3.2 MPa  
 Probable error.....(+/-): 2.2 KSI 15.2 MPa

File: S:\1005\2005\SBIR\50632\18429.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 9 / 0.15" from Edge of Hole / Hoop / ebm

*Residual Stress.....:	-6.6 KSI	-45.7 MPa
Counting Statistics Stress Error (+/-):	0.5 KSI	3.2 MPa
Probable error.....(+/-):	2.2 KSI	15.2 MPa



===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: S:\1005\2005\SBIR\50632\18430.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 10 / 0.05" from Edge of Hole / Hoop / ebm

Acquisition date & time: 6/01/2005 11:36am

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 30.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A -3.15219E-07 B 0.000115735 C 0.0531817 D 147.9227

Psi	Sin <sup>2</sup> (psi)	Pk Chan	Intens	FWHM	Kalp Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00010	149.79	861.0	3.39	0.26205	161.16	0.780806	0.000071
5.0	0.00596	149.52	922.6	3.47	0.26260	161.15	0.780827	0.000048
10.0	0.02725	147.19	939.1	3.09	0.25674	161.00	0.780996	0.000026
15.0	0.06178	150.59	846.3	3.39	0.26280	161.22	0.780746	0.000061
20.0	0.10956	152.49	929.6	3.52	0.26567	161.34	0.780607	0.000032
25.0	0.16791	156.75	803.0	3.52	0.26948	161.62	0.780298	0.000049
30.0	0.23884	154.69	888.2	3.15	0.26382	161.49	0.780442	0.000039
35.0	0.31311	161.80	1007.1	3.41	0.27297	161.95	0.779938	0.000040
40.0	0.39467	165.02	980.5	3.17	0.27271	162.16	0.779710	0.000028
45.0	0.48035	166.45	1035.7	3.27	0.27543	162.25	0.779612	0.000034

Fitted Delta D vs Sin<sup>2</sup>(psi) Data:

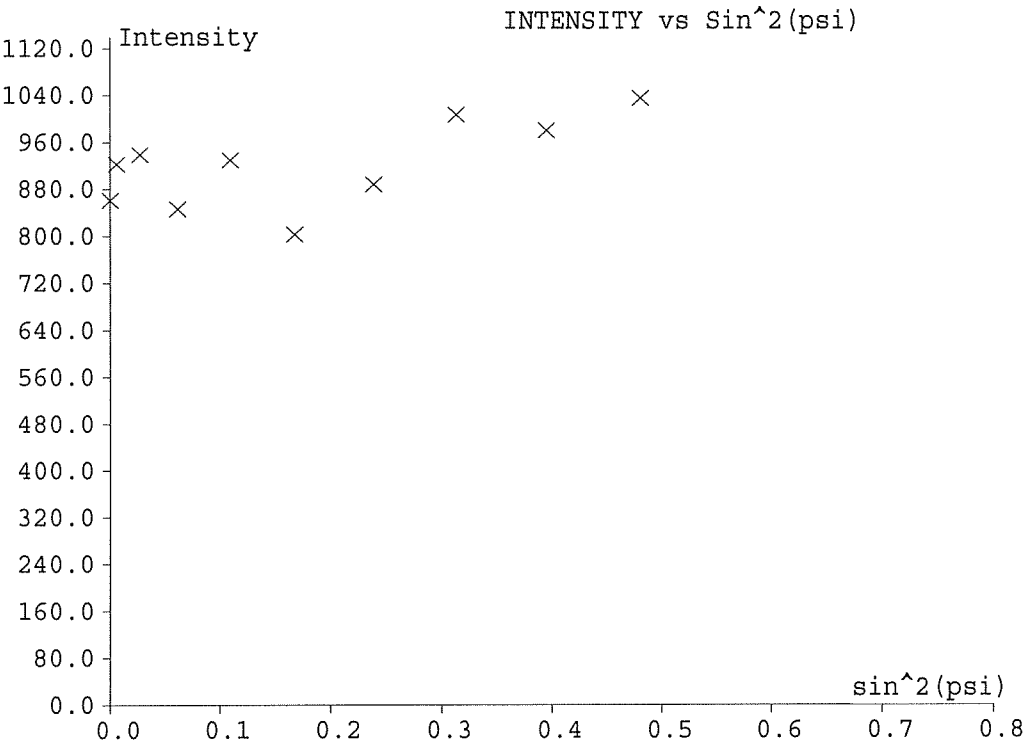
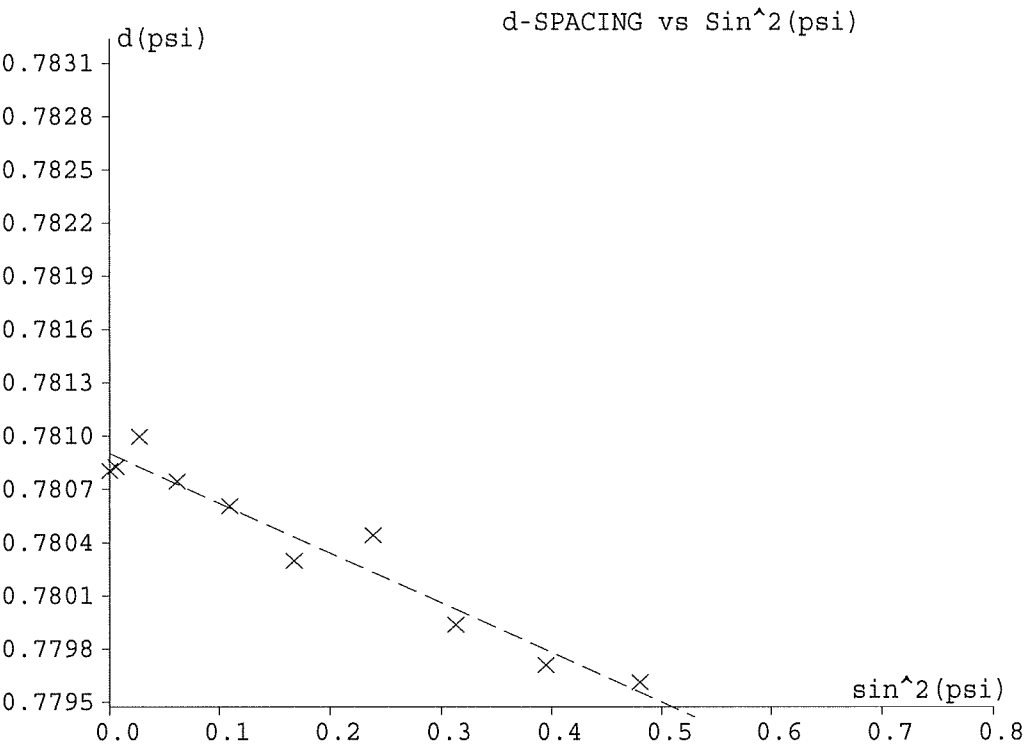
D Spacing Intercept.....: 0.780903  
Slope of Fitted Line.....: -0.002805  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -28.6 KSI -197.3 MPa

Counting Statistics Stress Error (+/-): 0.9 KSI 5.9 MPa  
Probable error.....(+/-): 2.5 KSI 17.0 MPa

File: S:\1005\2005\SBIR\50632\18430.STR  
Sample Description:  
SBIR / WP / CW Holes / AF Std. 10 / 0.05" from Edge of Hole / Hoop / ebm

\*Residual Stress.....: -28.6 KSI -197.3 MPa  
Counting Statistics Stress Error (+/-): 0.9 KSI 5.9 MPa  
Probable error.....(+/-): 2.5 KSI 17.0 MPa



===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: S:\1005\2005\SBIR\50632\18431.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 10 / 0.10" from Edge of Hole / Hoop / ebm

Acquisition date & time: 6/01/2005 11:44am

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 30.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A -3.15219E-07 B 0.000115735 C 0.0531817 D 147.9227

Psi	Sin <sup>2</sup> (psi)	Pk Chan	Intens	FWHM	Kalp Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00012	151.30	1098.9	2.99	0.25887	161.27	0.780688	0.000033
5.0	0.00564	153.18	1265.0	3.34	0.26462	161.39	0.780555	0.000037
10.0	0.02672	150.07	1397.2	3.15	0.25985	161.19	0.780782	0.000021
15.0	0.06127	152.35	1080.9	2.97	0.25941	161.34	0.780611	0.000029
20.0	0.10903	153.94	1145.5	3.18	0.26363	161.44	0.780498	0.000027
25.0	0.16832	155.74	1245.3	3.13	0.26447	161.56	0.780366	0.000026
30.0	0.23874	154.91	1147.1	3.25	0.26524	161.50	0.780428	0.000026
35.0	0.31453	159.08	1007.5	3.23	0.26861	161.77	0.780128	0.000037
40.0	0.39624	162.23	958.1	3.43	0.27362	161.98	0.779908	0.000034
45.0	0.48319	161.41	1139.7	3.17	0.26976	161.93	0.779962	0.000035

Fitted Delta D vs Sin<sup>2</sup>(psi) Data:

D Spacing Intercept.....: 0.780693  
Slope of Fitted Line.....: -0.001668  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -17.0 KSI -117.4 MPa

Counting Statistics Stress Error (+/-): 0.7 KSI 4.6 MPa  
Probable error.....(+/-): 1.9 KSI 13.4 MPa

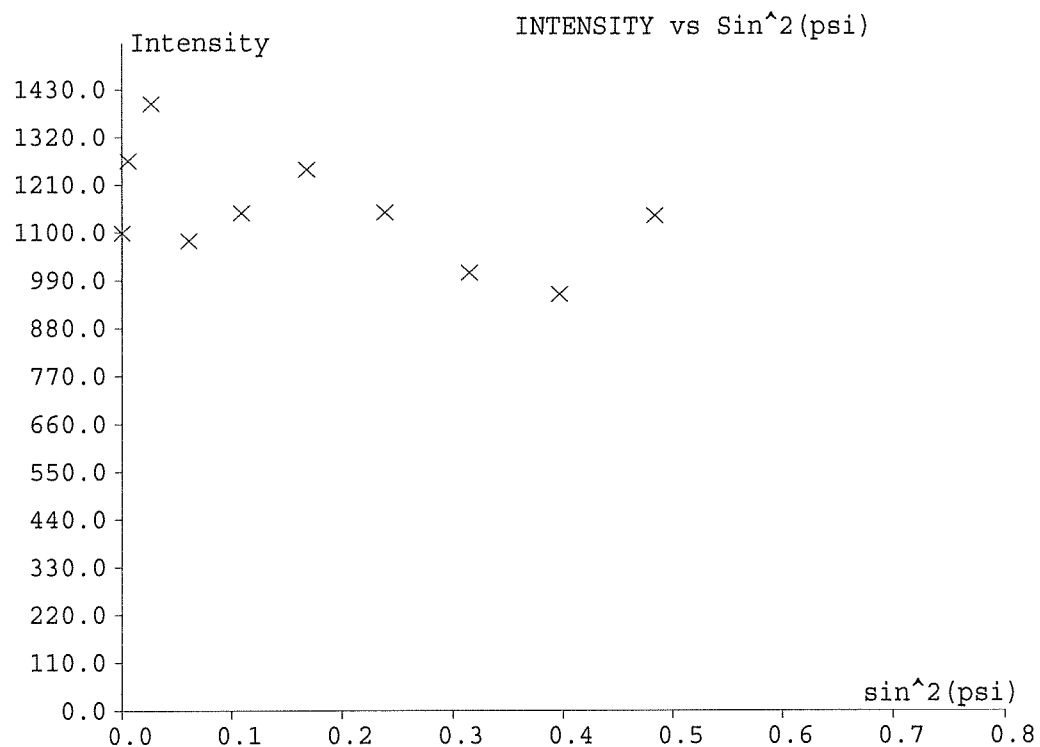
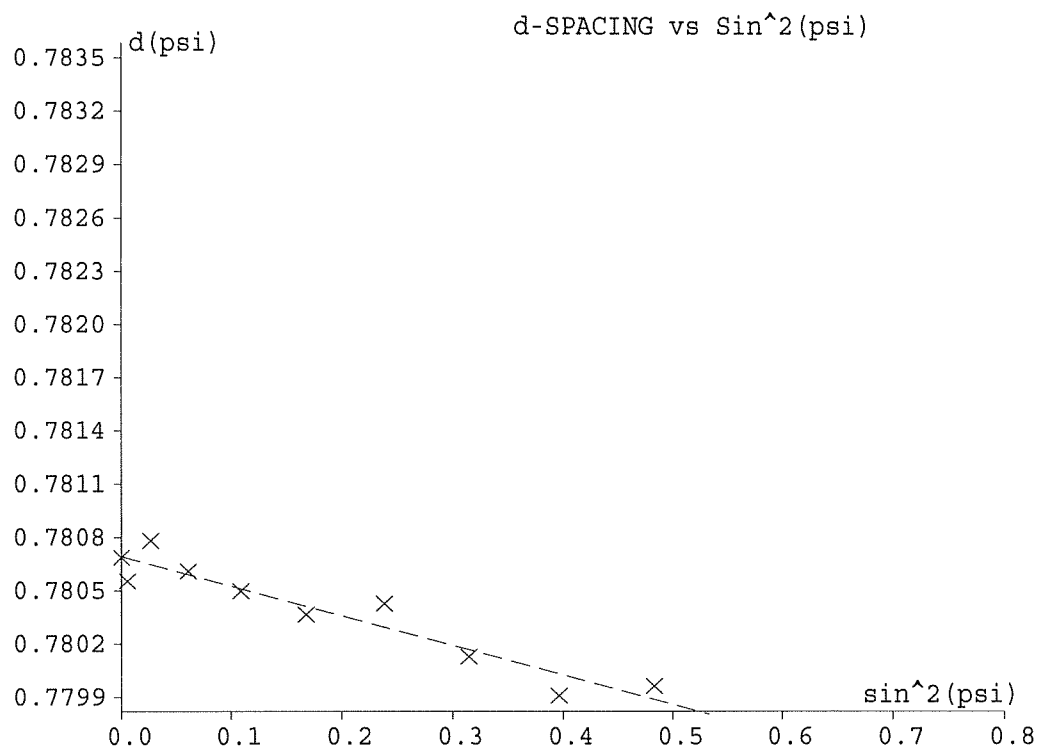


File: S:\1005\2005\SBIR\50632\18431.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 10 / 0.10" from Edge of Hole / Hoop / ebm

*Residual Stress.....:	-17.0 KSI	-117.4 MPa
Counting Statistics Stress Error (+/-):	0.7 KSI	4.6 MPa
Probable error.....(+/-):	1.9 KSI	13.4 MPa



===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: S:\1005\2005\SBIR\50632\18432.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 10 / 0.15" from Edge of Hole / Hoop / ebm

Acquisition date & time: 6/01/2005 11:55am

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 30.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A -3.15219E-07 B 0.000115735 C 0.0531817 D 147.9227

Psi	Sin <sup>2</sup> (psi)	Pk Chan	Intens	FWHM	Kalp	Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00016	153.79	1276.9	3.07	0.26190		161.43	0.780507	0.000021
5.0	0.00556	154.02	1173.3	3.12	0.26286		161.44	0.780491	0.000030
10.0	0.02595	154.23	1256.0	3.02	0.26159		161.46	0.780474	0.000026
15.0	0.06111	153.00	1056.5	3.25	0.26364		161.38	0.780568	0.000029
20.0	0.10878	154.63	1132.6	3.06	0.26256		161.49	0.780446	0.000025
25.0	0.16867	154.85	1136.6	2.87	0.25962		161.50	0.780426	0.000022
30.0	0.23959	153.11	1062.8	2.93	0.25931		161.39	0.780554	0.000024
35.0	0.31589	156.48	1213.9	3.14	0.26515		161.61	0.780313	0.000025
40.0	0.40129	153.17	1028.9	3.32	0.26445		161.39	0.780556	0.000019
45.0	0.48676	154.97	1088.6	2.61	0.25336		161.52	0.780411	0.000020

Fitted Delta D vs Sin<sup>2</sup>(psi) Data:

D Spacing Intercept.....: 0.780499  
Slope of Fitted Line.....: -0.0001327  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -1.4 KSI -9.3 MPa

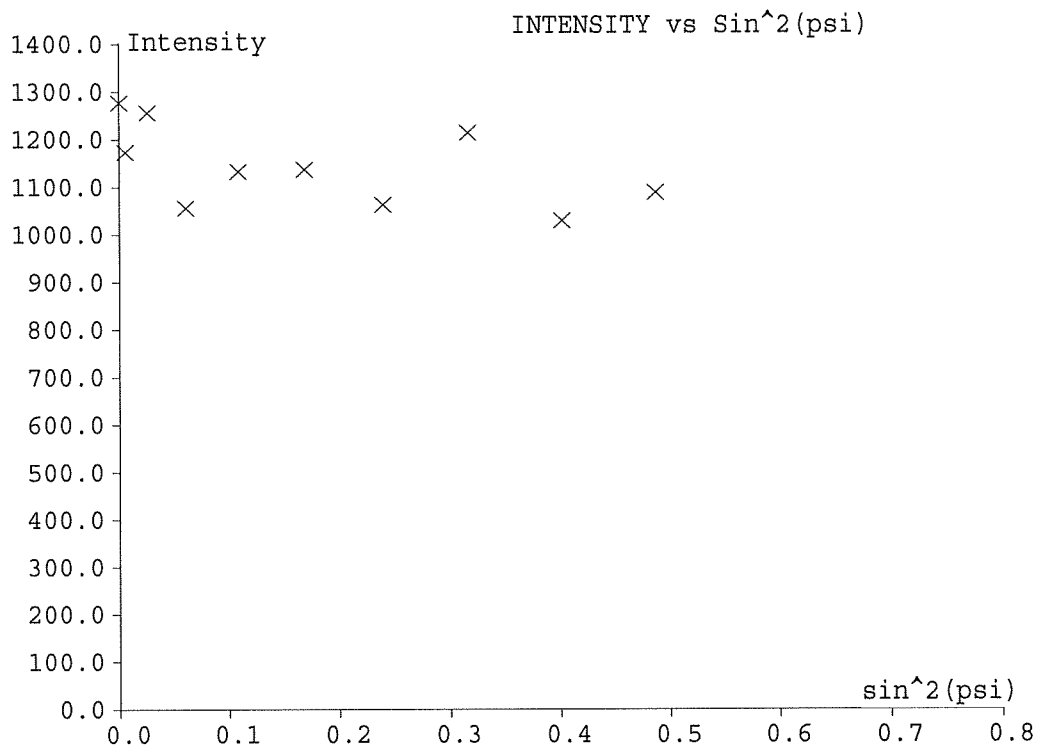
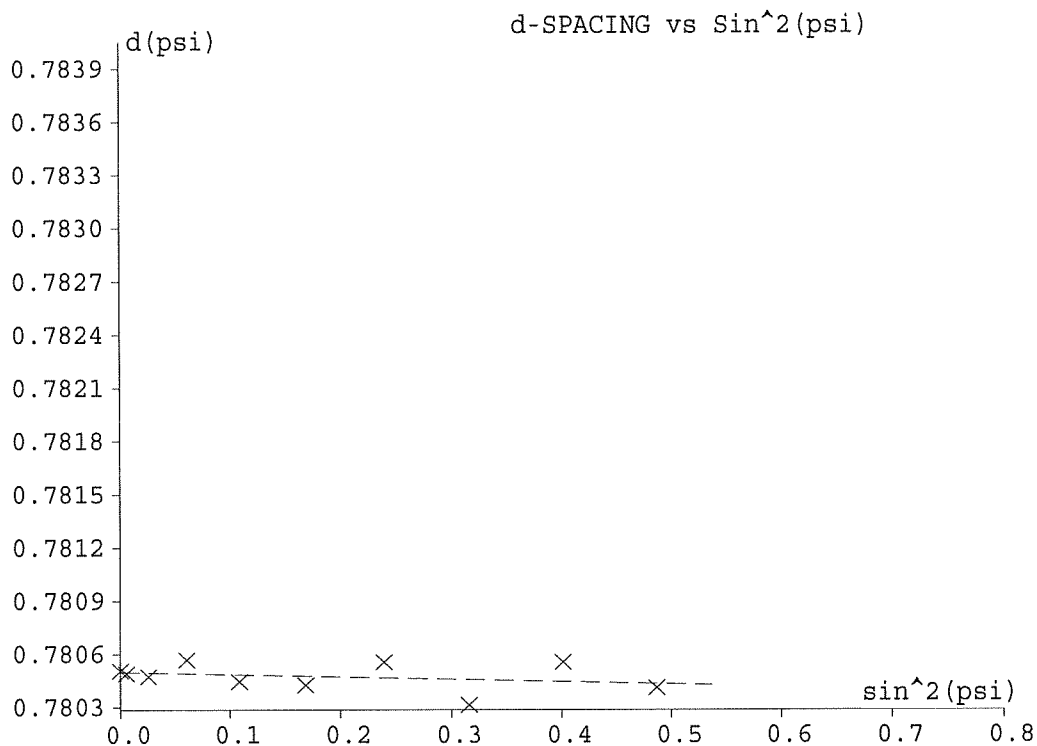
Counting Statistics Stress Error (+/-): 0.4 KSI 3.1 MPa  
Probable error.....(+/-): 1.6 KSI 10.9 MPa

File: S:\1005\2005\SBIR\50632\18432.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 10 / 0.15" from Edge of Hole / Hoop / ebm

*Residual Stress.....:	-1.4 KSI	-9.3 MPa
Counting Statistics Stress Error (+/-):	0.4 KSI	3.1 MPa
Probable error.....(+/-):	1.6 KSI	10.9 MPa



===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: S:\1005\2005\SBIR\50632\18433.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 11 / 0.05" from Edge of Hole / Hoop / ebm

Acquisition date & time: 6/01/2005 0:03pm

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 30.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A -3.15219E-07 B 0.000115735 C 0.0531817 D 147.9227

Psi	Sin <sup>2</sup> (psi)	Pk Chan	Intens	FWHM	Kalp Cor	A	2-Theta	D Spacing	St. Dev.
0.0	0.00009	148.15	1117.1	3.07	0.25731		161.06	0.780924	0.000026
5.0	0.00605	148.44	958.5	3.21	0.25930		161.08	0.780904	0.000036
10.0	0.02690	149.07	1174.4	3.18	0.25940		161.12	0.780857	0.000028
15.0	0.06185	150.26	1011.4	3.10	0.25949		161.20	0.780767	0.000029
20.0	0.10923	153.41	1032.7	3.34	0.26477		161.40	0.780538	0.000038
25.0	0.16867	154.95	1036.5	3.30	0.26577		161.50	0.780425	0.000039
30.0	0.23832	155.80	1088.6	3.38	0.26732		161.56	0.780365	0.000057
35.0	0.31478	158.65	1048.7	3.56	0.27145		161.74	0.780162	0.000059
40.0	0.39536	163.82	1038.3	3.43	0.27504		162.08	0.779797	0.000052
45.0	0.48019	166.75	944.2	3.37	0.27700		162.27	0.779594	0.000028

Fitted Delta D vs Sin<sup>2</sup>(psi) Data:

D Spacing Intercept.....: 0.780920  
Slope of Fitted Line.....: -0.002703  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -27.6 KSI -190.2 MPa

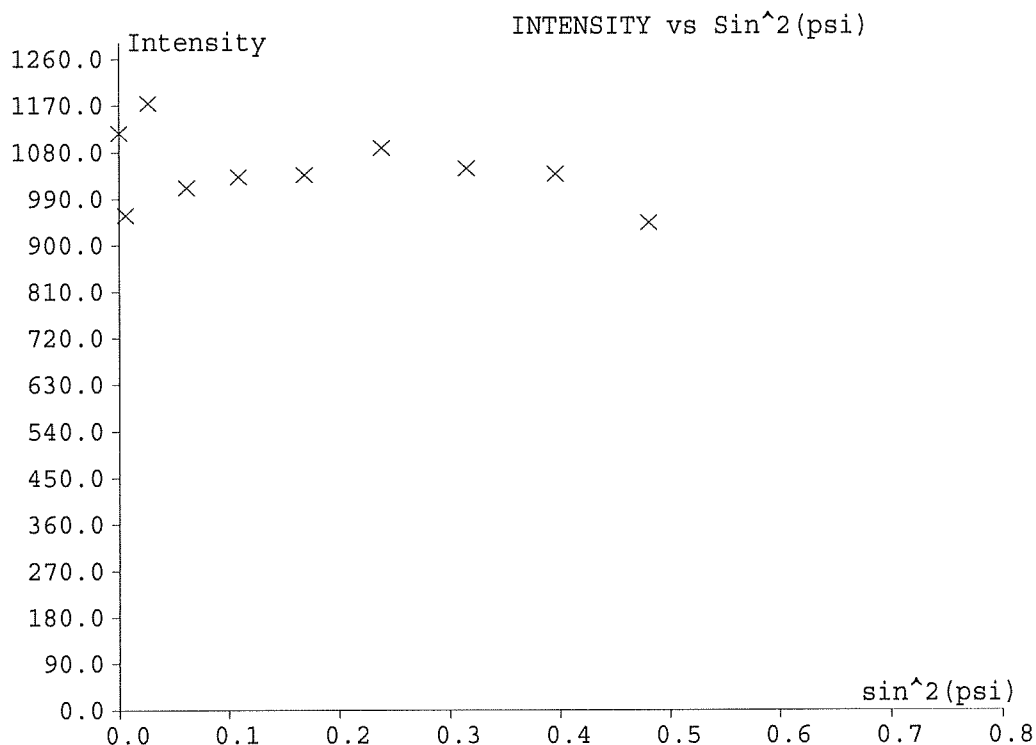
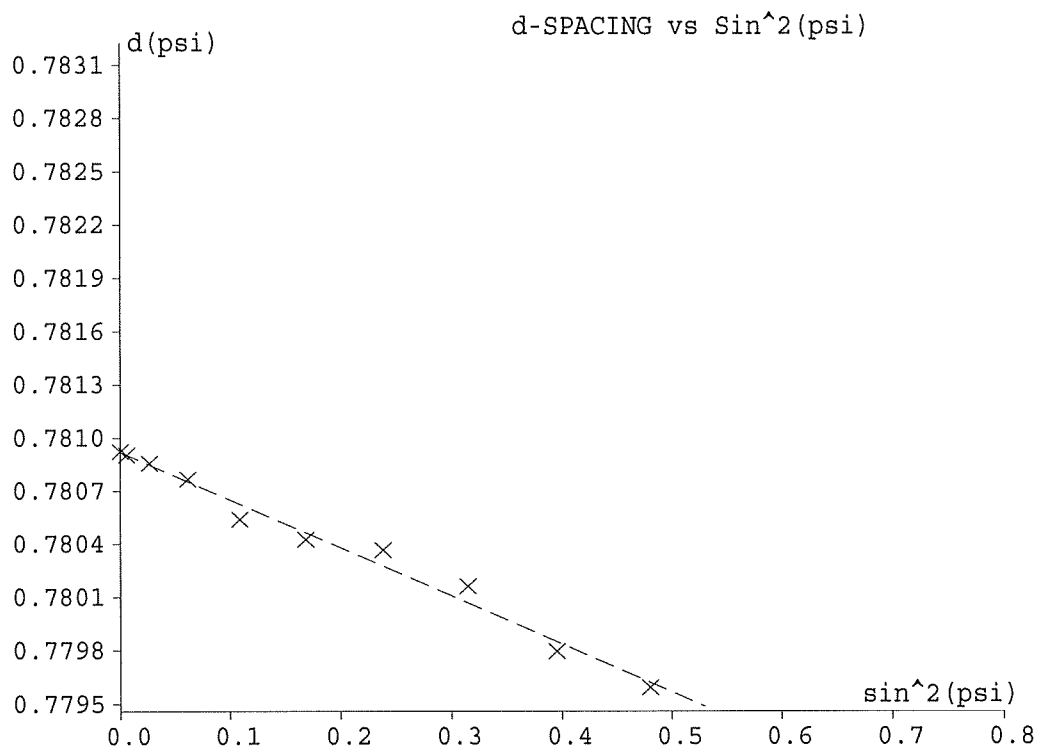
Counting Statistics Stress Error (+/-): 0.7 KSI 5.2 MPa  
Probable error.....(+/-): 1.2 KSI 8.4 MPa  
Warning: Counting statistics may be the controlling error!

File: S:\1005\2005\SBIR\50632\18433.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 11 / 0.05" from Edge of Hole / Hoop / ebm

*Residual Stress.....:	-27.6 KSI	-190.2 MPa
Counting Statistics Stress Error (+/-):	0.7 KSI	5.2 MPa
Probable error.....(+/-):	1.2 KSI	8.4 MPa



===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: S:\1005\2005\SBIR\50632\18434.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 11 / 0.10" from Edge of Hole / Hoop / ebm

Acquisition date & time: 6/01/2005 0:11pm

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 30.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A -3.15219E-07 B 0.000115735 C 0.0531817 D 147.9227

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00012	150.91	1420.7	3.35	0.26268	161.24	0.780722	0.000028
5.0	0.00564	153.26	1248.0	3.61	0.26710	161.39	0.780552	0.000040
10.0	0.02619	152.97	1618.6	3.20	0.26302	161.37	0.780569	0.000024
15.0	0.06132	152.24	1303.0	3.43	0.26464	161.32	0.780625	0.000028
20.0	0.10883	154.47	1076.0	3.08	0.26270	161.47	0.780458	0.000027
25.0	0.16930	153.41	1209.6	2.93	0.25966	161.41	0.780533	0.000024
30.0	0.23768	157.07	1242.5	3.13	0.26548	161.64	0.780270	0.000025
35.0	0.31454	159.09	1225.2	3.45	0.27094	161.77	0.780129	0.000034
40.0	0.39734	160.18	1322.6	3.08	0.26739	161.85	0.780048	0.000021
45.0	0.48209	163.39	1152.3	3.41	0.27446	162.05	0.779826	0.000028

Fitted Delta D vs Sin^2(psi) Data:

D Spacing Intercept.....: 0.780669  
Slope of Fitted Line.....: -0.001643  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -16.8 KSI -115.6 MPa

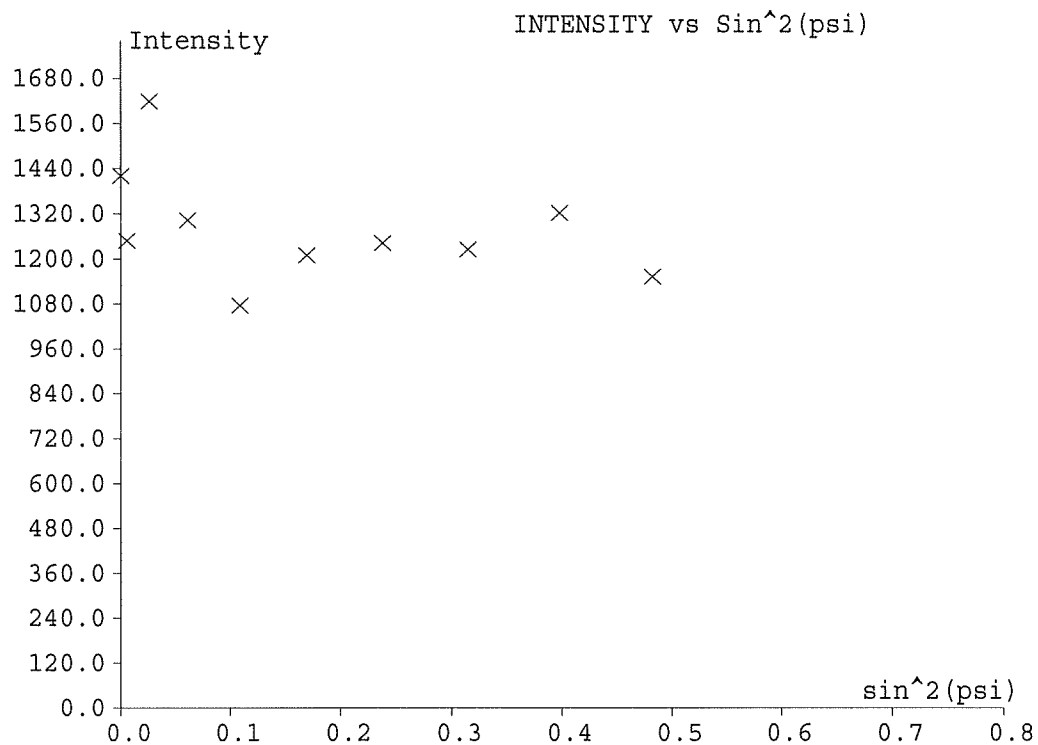
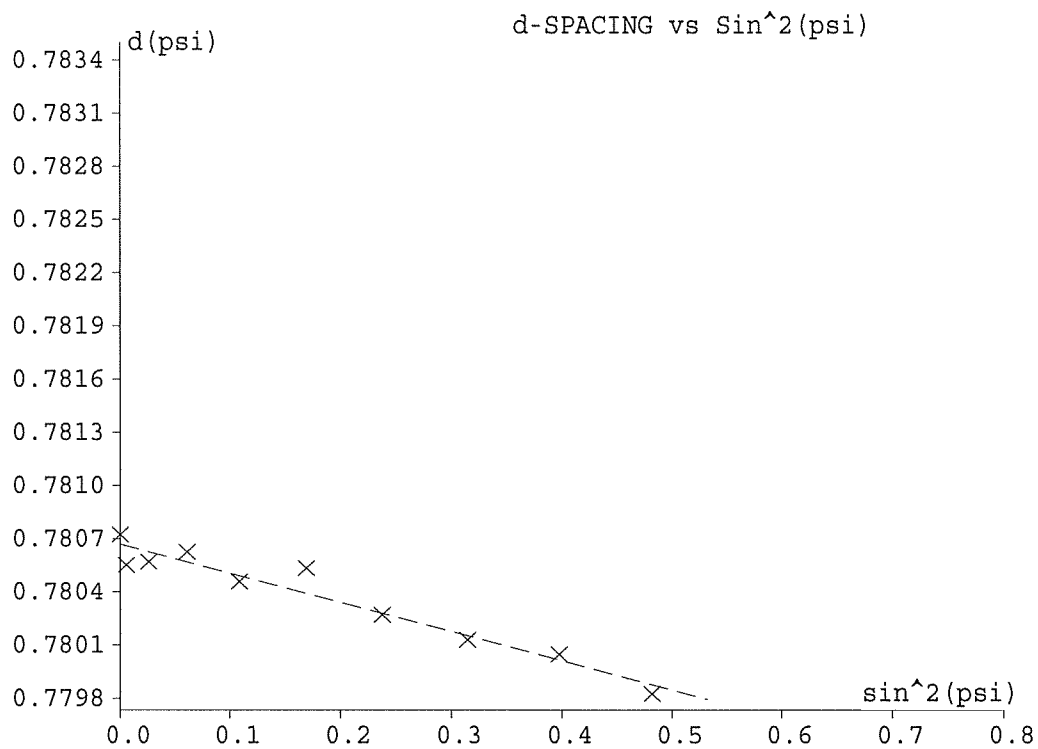
Counting Statistics Stress Error (+/-): 0.6 KSI 3.9 MPa  
Probable error.....(+/-): 1.5 KSI 10.4 MPa

File: S:\1005\2005\SBIR\50632\18434.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 11 / 0.10" from Edge of Hole / Hoop / ebm

*Residual Stress.....:	-16.8 KSI	-115.6 MPa
Counting Statistics Stress Error (+/-):	0.6 KSI	3.9 MPa
Probable error.....(+/-):	1.5 KSI	10.4 MPa



===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: S:\1005\2005\SBIR\50632\18435.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 11 / 0.15" from Edge of Hole / Hoop / ebm

Acquisition date & time: 6/01/2005 0:27pm

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 30.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A -3.15219E-07 B 0.000115735 C 0.0531817 D 147.9227

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00021	157.45	1313.6	3.13	0.26585	161.67	0.780243	0.000029
5.0	0.00511	159.58	1236.8	3.36	0.27047	161.80	0.780094	0.000028
10.0	0.02543	157.15	1326.3	3.18	0.26626	161.65	0.780265	0.000032
15.0	0.05973	158.12	1040.9	3.48	0.27033	161.71	0.780199	0.000039
20.0	0.10787	157.15	1104.0	2.96	0.26312	161.65	0.780261	0.000020
25.0	0.16861	154.95	1047.1	2.75	0.25742	161.51	0.780417	0.000022
30.0	0.23688	158.68	1089.4	2.97	0.26455	161.75	0.780152	0.000031
35.0	0.31409	159.88	1050.9	3.06	0.26684	161.83	0.780069	0.000028
40.0	0.39796	159.02	1195.0	2.89	0.26312	161.78	0.780126	0.000019
45.0	0.48311	161.56	1095.3	3.25	0.27093	161.94	0.779952	0.000042

Fitted Delta D vs Sin^2(psi) Data:

D Spacing Intercept.....: 0.780257  
Slope of Fitted Line.....: -0.0004407  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -4.5 KSI -31.0 MPa

Counting Statistics Stress Error (+/-): 0.7 KSI 4.5 MPa  
Probable error.....(+/-): 2.2 KSI 15.1 MPa

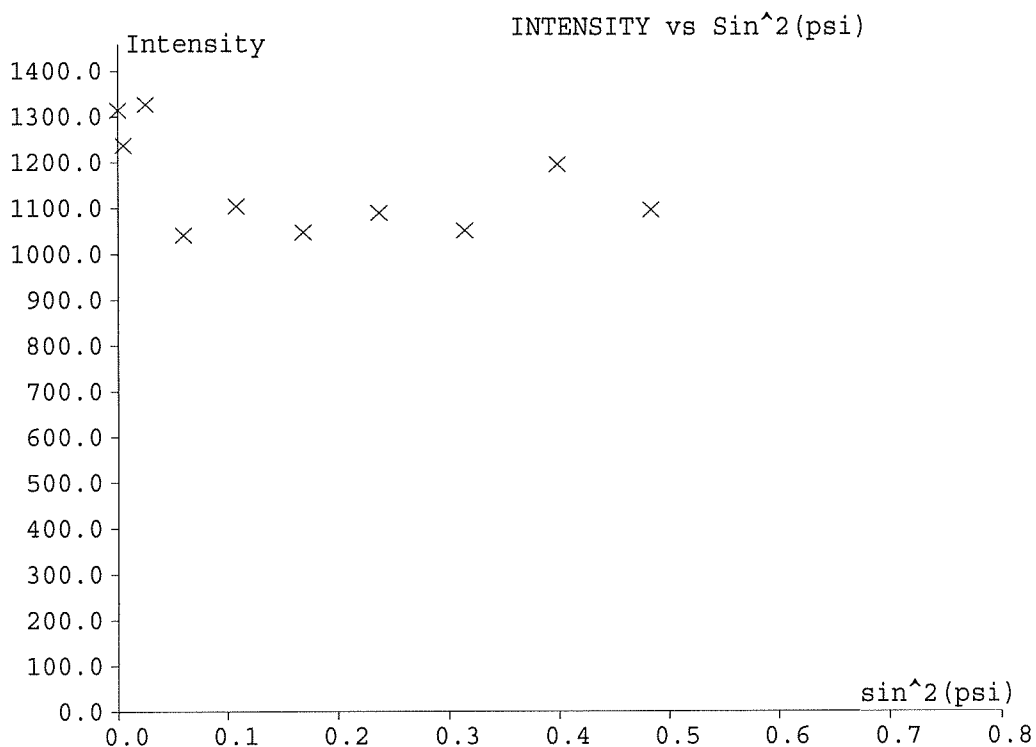
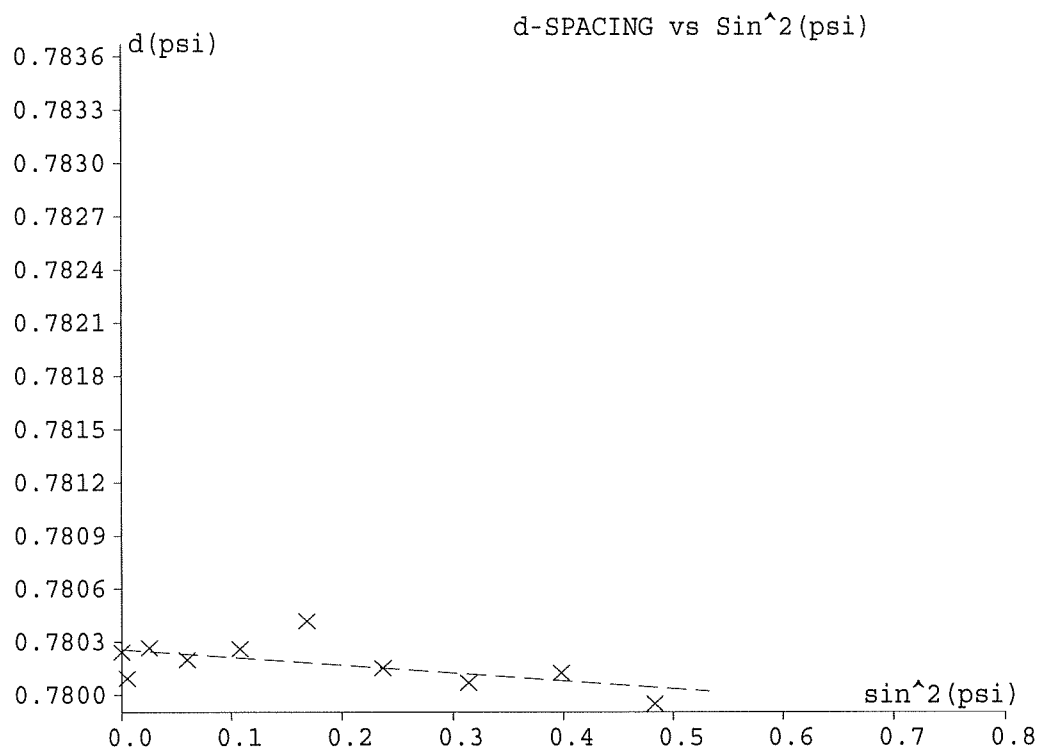


File: S:\1005\2005\SBIR\50632\18435.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 11 / 0.15" from Edge of Hole / Hoop / ebm

*Residual Stress.....	-4.5 KSI	-31.0 MPa
Counting Statistics Stress Error (+/-):	0.7 KSI	4.5 MPa
Probable error.....(+/-):	2.2 KSI	15.1 MPa



===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: S:\1005\2005\SBIR\50632\18436.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 12 / 0.05" from Edge of Hole / Hoop / ebm

Acquisition date & time: 6/01/2005 0:36pm

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 30.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A -3.15219E-07 B 0.000115735 C 0.0531817 D 147.9227

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp	Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00003	140.97	885.6	2.76	0.24712		160.59	0.781465	0.000029
5.0	0.00640	144.53	959.2	3.14	0.25512		160.82	0.781198	0.000033
10.0	0.02724	147.31	873.2	3.34	0.25948		161.00	0.780990	0.000046
15.0	0.06248	148.07	952.3	3.42	0.26085		161.05	0.780934	0.000046
20.0	0.11111	148.20	798.3	3.60	0.26249		161.06	0.780926	0.000044
25.0	0.16978	152.37	873.7	3.46	0.26497		161.33	0.780616	0.000029
30.0	0.23895	154.52	993.3	3.50	0.26730		161.47	0.780459	0.000028
35.0	0.31419	159.74	975.6	3.41	0.27109		161.82	0.780083	0.000031
40.0	0.39252	169.05	891.1	3.94	0.28462		162.41	0.779442	0.000030
45.0	0.47790	170.90	906.3	3.78	0.28536		162.53	0.779317	0.000033

Fitted Delta D vs Sin^2(psi) Data:

D Spacing Intercept.....: 0.781296  
Slope of Fitted Line.....: -0.004182  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -42.6 KSI -294.0 MPa

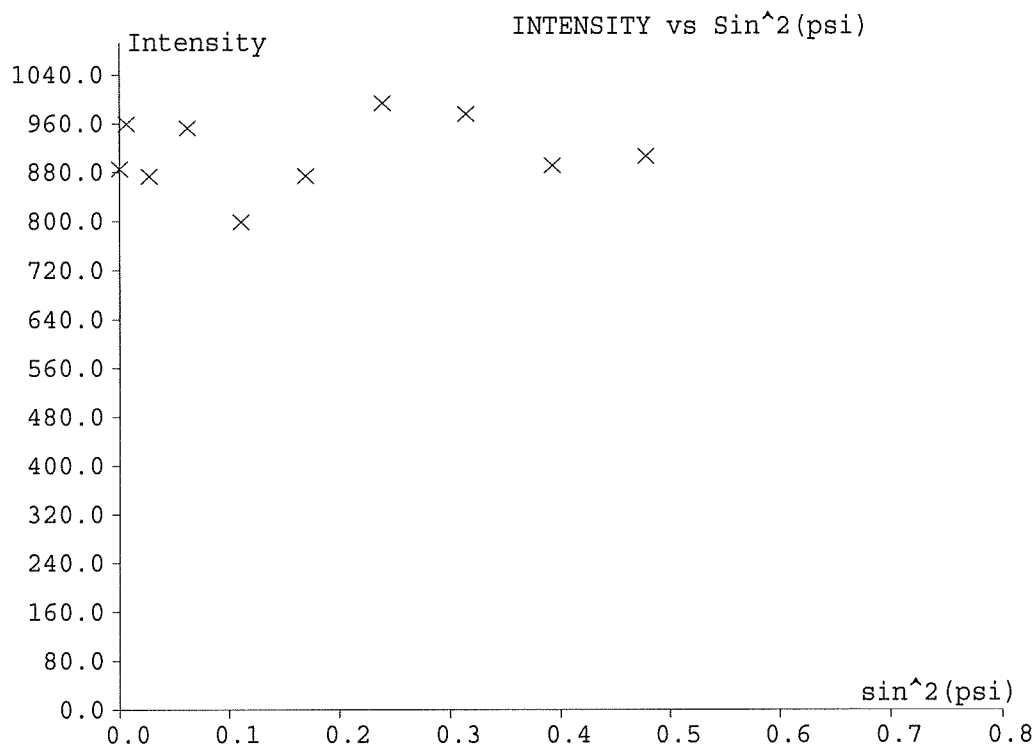
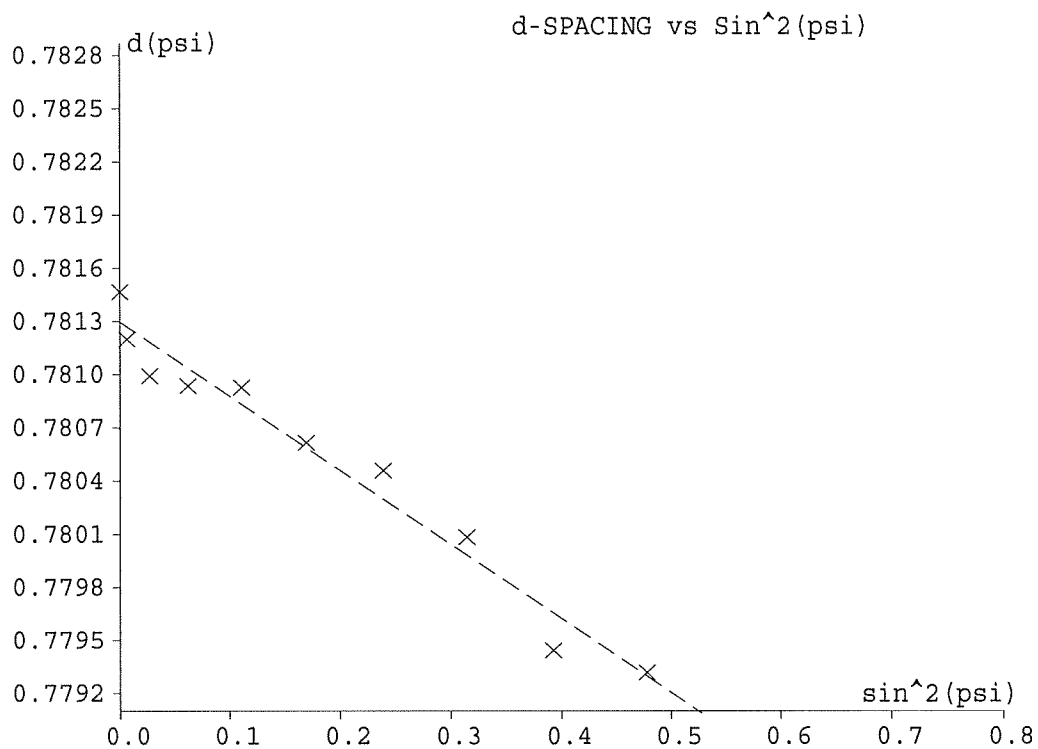
Counting Statistics Stress Error (+/-): 0.7 KSI 4.7 MPa  
Probable error.....(+/-): 2.9 KSI 20.2 MPa

File: S:\1005\2005\SBIR\50632\18436.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 12 / 0.05" from Edge of Hole / Hoop / ebm

*Residual Stress.....:	-42.6 KSI	-294.0 MPa
Counting Statistics Stress Error (+/-):	0.7 KSI	4.7 MPa
Probable error.....(+/-):	2.9 KSI	20.2 MPa



===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: S:\1005\2005\SBIR\50632\18437.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 12 / 0.10" from Edge of Hole / Hoop / ebm

Acquisition date & time: 6/01/2005 0:44pm

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 30.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A -3.15219E-07 B 0.000115735 C 0.0531817 D 147.9227

Psi	Sin <sup>2</sup> (psi)	Pk Chan	Intens	FWHM	Kalp	Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00008	147.59	1210.2	3.27	0.25909		161.02	0.780969	0.000039
5.0	0.00610	147.89	1318.6	3.37	0.26020		161.04	0.780947	0.000034
10.0	0.02650	151.29	1321.0	3.41	0.26360		161.26	0.780695	0.000028
15.0	0.06206	149.55	1156.0	3.24	0.26051		161.15	0.780822	0.000024
20.0	0.10955	152.50	1088.5	3.32	0.26381		161.34	0.780604	0.000035
25.0	0.16952	152.84	1135.8	2.75	0.25570		161.37	0.780571	0.000023
30.0	0.23856	155.23	993.6	2.96	0.26158		161.53	0.780401	0.000029
35.0	0.31378	160.49	1092.4	3.25	0.27011		161.87	0.780028	0.000036
40.0	0.39849	158.11	1004.0	3.01	0.26470		161.71	0.780194	0.000021
45.0	0.48170	164.04	1063.1	3.20	0.27232		162.10	0.779778	0.000032

Fitted Delta D vs Sin<sup>2</sup>(psi) Data:

D Spacing Intercept.....: 0.780904  
Slope of Fitted Line.....: -0.002232  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -22.8 KSI -157.0 MPa

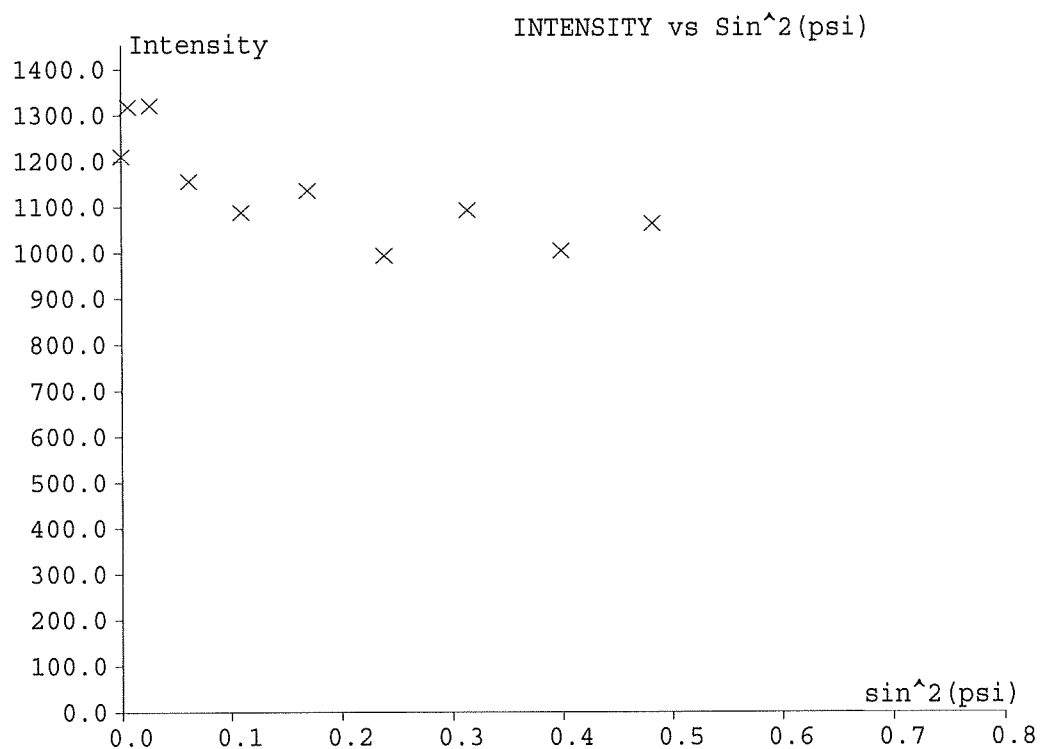
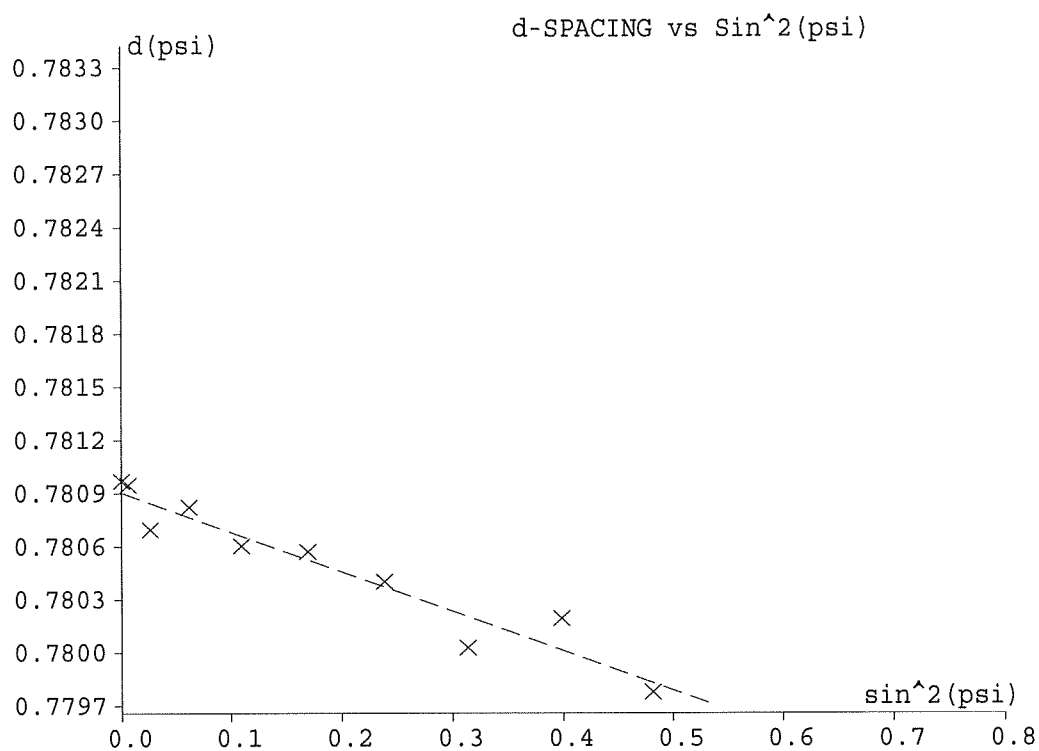
Counting Statistics Stress Error (+/-): 0.6 KSI 4.2 MPa  
Probable error.....(+/-): 2.3 KSI 15.6 MPa

File: S:\1005\2005\SBIR\50632\18437.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 12 / 0.10" from Edge of Hole / Hoop / ebm

*Residual Stress.....:	-22.8 KSI	-157.0 MPa
Counting Statistics Stress Error (+/-):	0.6 KSI	4.2 MPa
Probable error.....(+/-):	2.3 KSI	15.6 MPa



===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: S:\1005\2005\SBIR\50632\18438.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 12 / 0.15" from Edge of Hole / Hoop / ebm

Acquisition date & time: 6/01/2005 0:52pm

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 30.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A -3.15219E-07 B 0.000115735 C 0.0531817 D 147.9227

Psi	Sin <sup>2</sup> (psi)	Pk Chan	Intens	FWHM	Kalp	Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00010	149.56	1513.9	3.12	0.25911		161.15	0.780820	0.000023
5.0	0.00583	150.99	1340.7	3.36	0.26288		161.24	0.780717	0.000029
10.0	0.02599	154.01	1411.4	3.09	0.26238		161.44	0.780491	0.000027
15.0	0.06149	151.61	1297.1	3.17	0.26147		161.29	0.780668	0.000027
20.0	0.10960	152.35	1055.3	3.13	0.26161		161.33	0.780614	0.000031
25.0	0.16996	151.83	1171.1	2.85	0.25684		161.31	0.780647	0.000024
30.0	0.23795	156.46	1068.2	2.91	0.26151		161.61	0.780310	0.000021
35.0	0.31347	161.09	1103.8	3.24	0.27047		161.91	0.779985	0.000031
40.0	0.39953	156.25	1106.0	2.98	0.26272		161.59	0.780327	0.000021
45.0	0.48390	160.11	1189.0	2.94	0.26502		161.85	0.780050	0.000020

Fitted Delta D vs Sin<sup>2</sup>(psi) Data:

D Spacing Intercept.....: 0.780718  
Slope of Fitted Line.....: -0.001412  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -14.4 KSI -99.4 MPa

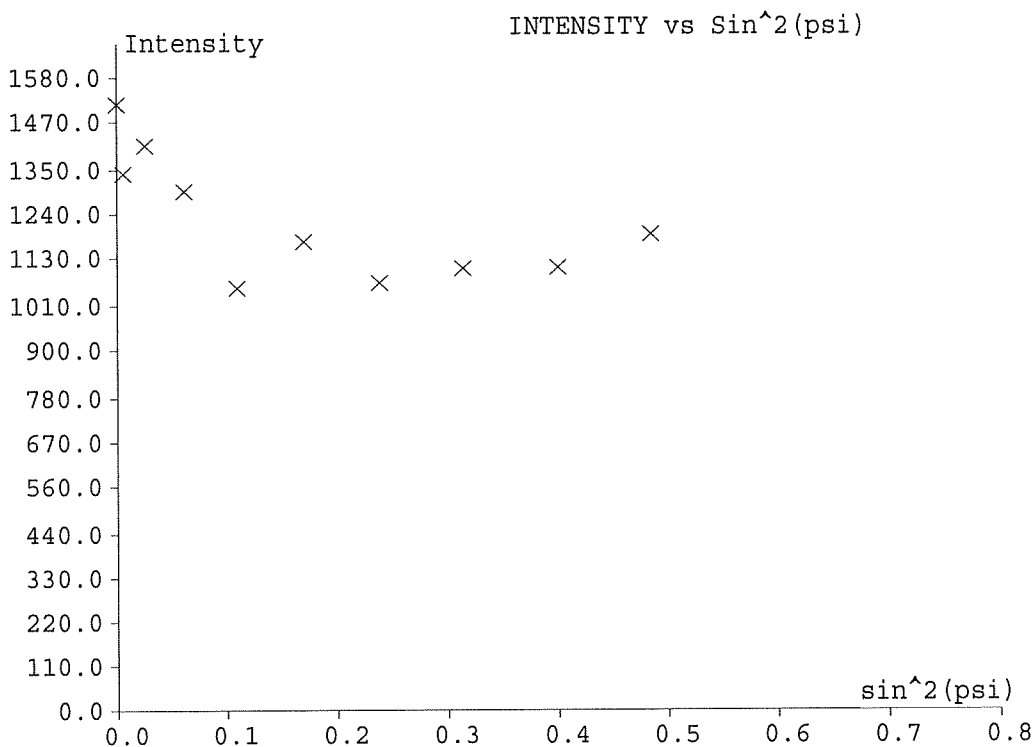
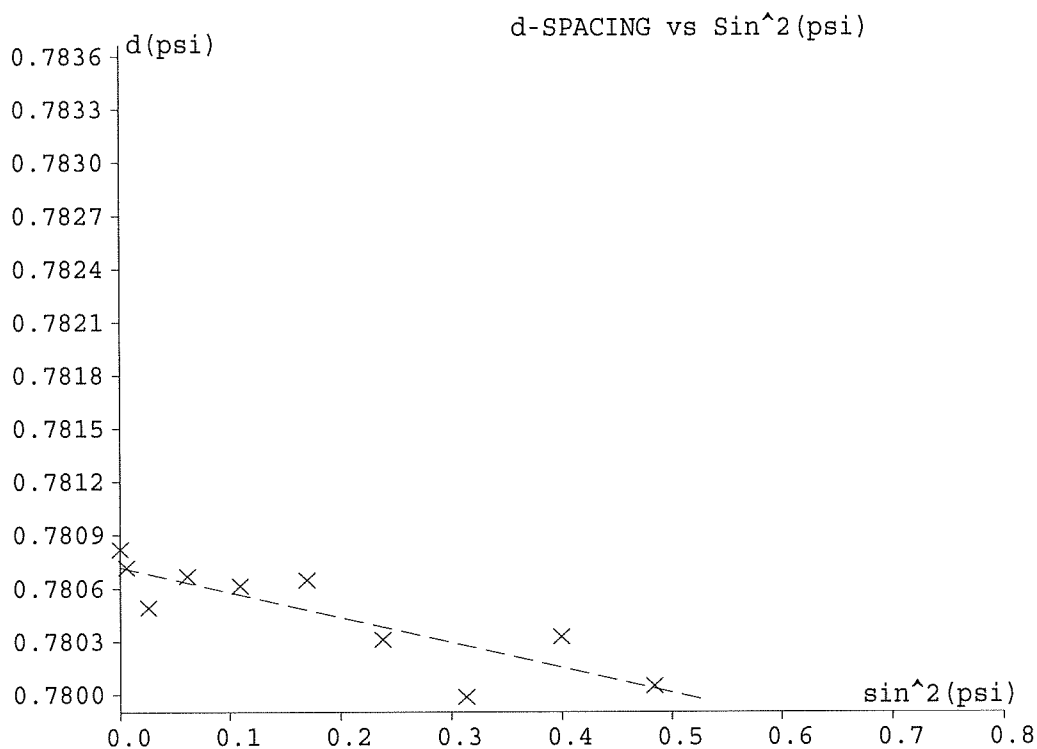
Counting Statistics Stress Error (+/-): 0.5 KSI 3.3 MPa  
Probable error.....(+/-): 3.1 KSI 21.4 MPa

File: S:\1005\2005\SBIR\50632\18438.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 12 / 0.15" from Edge of Hole / Hoop / ebm

*Residual Stress.....:	-14.4 KSI	-99.4 MPa
Counting Statistics Stress Error (+/-):	0.5 KSI	3.3 MPa
Probable error.....(+/-):	3.1 KSI	21.4 MPa



===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: S:\1005\2005\SBIR\50632\18439.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 13 / 0.05" from Edge of Hole / Hoop / ebm

Acquisition date & time: 6/01/2005 1:07pm

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 30.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A -3.15219E-07 B 0.000115735 C 0.0531817 D 147.9227

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp	Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00005	144.82	980.3	3.43	0.25805		160.84	0.781179	0.000039
5.0	0.00621	146.70	935.6	3.47	0.26004		160.96	0.781037	0.000036
10.0	0.02753	145.83	942.0	3.79	0.26217		160.90	0.781107	0.000039
15.0	0.06261	147.59	1074.1	3.40	0.26026		161.02	0.780970	0.000035
20.0	0.10984	151.74	858.7	3.59	0.26555		161.29	0.780664	0.000052
25.0	0.16919	153.75	910.8	3.46	0.26621		161.42	0.780515	0.000035
30.0	0.23678	159.02	996.3	3.72	0.27300		161.77	0.780137	0.000041
35.0	0.31298	162.08	1033.2	3.63	0.27541		161.97	0.779920	0.000038
40.0	0.39273	168.63	1031.8	3.65	0.28194		162.39	0.779469	0.000033
45.0	0.47856	169.68	906.2	3.49	0.28135		162.46	0.779396	0.000030

Fitted Delta D vs Sin^2(psi) Data:

D Spacing Intercept.....: 0.781146  
Slope of Fitted Line.....: -0.003931  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -40.1 KSI -276.5 MPa

Counting Statistics Stress Error (+/-): 0.7 KSI 4.8 MPa  
Probable error.....(+/-): 1.8 KSI 12.2 MPa

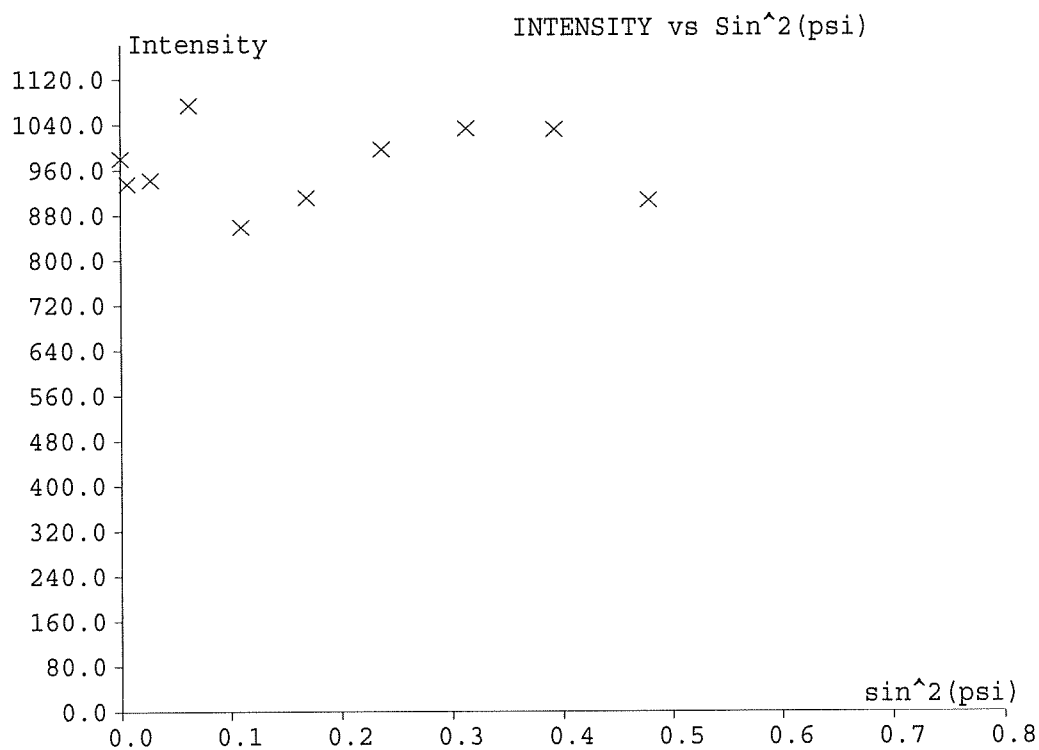
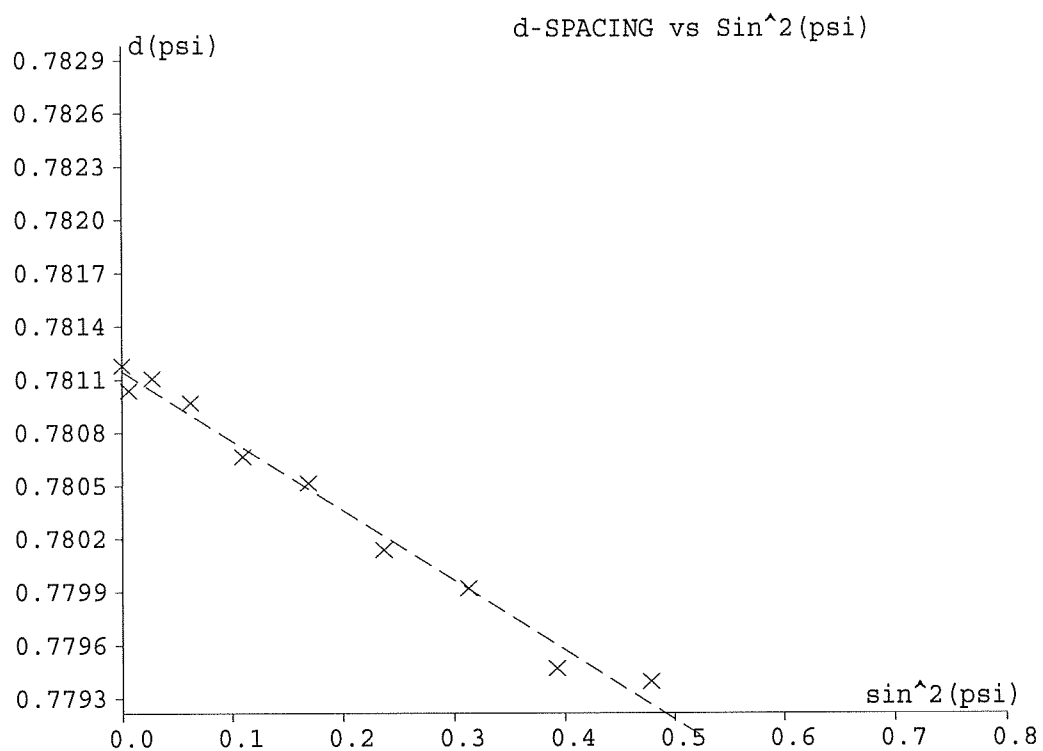


File: S:\1005\2005\SBIR\50632\18439.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 13 / 0.05" from Edge of Hole / Hoop / ebm

\*Residual Stress.....: -40.1 KSI -276.5 MPa  
Counting Statistics Stress Error (+/-): 0.7 KSI 4.8 MPa  
Probable error.....(+/-): 1.8 KSI 12.2 MPa



===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: S:\1005\2005\SBIR\50632\18440.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 13 / 0.10" from Edge of Hole / Hoop / ebm

Acquisition date & time: 6/01/2005 1:15pm

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 30.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A -3.15219E-07 B 0.000115735 C 0.0531817 D 147.9227

Psi	Sin <sup>2</sup> (psi)	Pk Chan	Intens	FWHM	Kalp	Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00009	148.76	1423.3	3.40	0.26123		161.10	0.780882	0.000034
5.0	0.00559	153.64	1460.3	3.03	0.26128		161.42	0.780517	0.000023
10.0	0.02668	150.33	1237.0	3.44	0.26303		161.20	0.780766	0.000027
15.0	0.06058	154.97	1412.7	3.42	0.26699		161.50	0.780425	0.000045
20.0	0.10997	151.32	1260.6	3.25	0.26220		161.27	0.780691	0.000030
25.0	0.16899	154.18	1197.0	3.22	0.26429		161.45	0.780481	0.000027
30.0	0.23807	156.31	1241.8	3.30	0.26700		161.59	0.780327	0.000027
35.0	0.31415	159.75	1181.1	3.01	0.26602		161.82	0.780077	0.000020
40.0	0.39570	163.23	1139.7	3.61	0.27632		162.04	0.779840	0.000039
45.0	0.48007	166.93	1058.6	3.21	0.27484		162.28	0.779578	0.000033

Fitted Delta D vs Sin<sup>2</sup>(psi) Data:

D Spacing Intercept.....: 0.780770  
Slope of Fitted Line.....: -0.002287  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -23.3 KSI -160.9 MPa

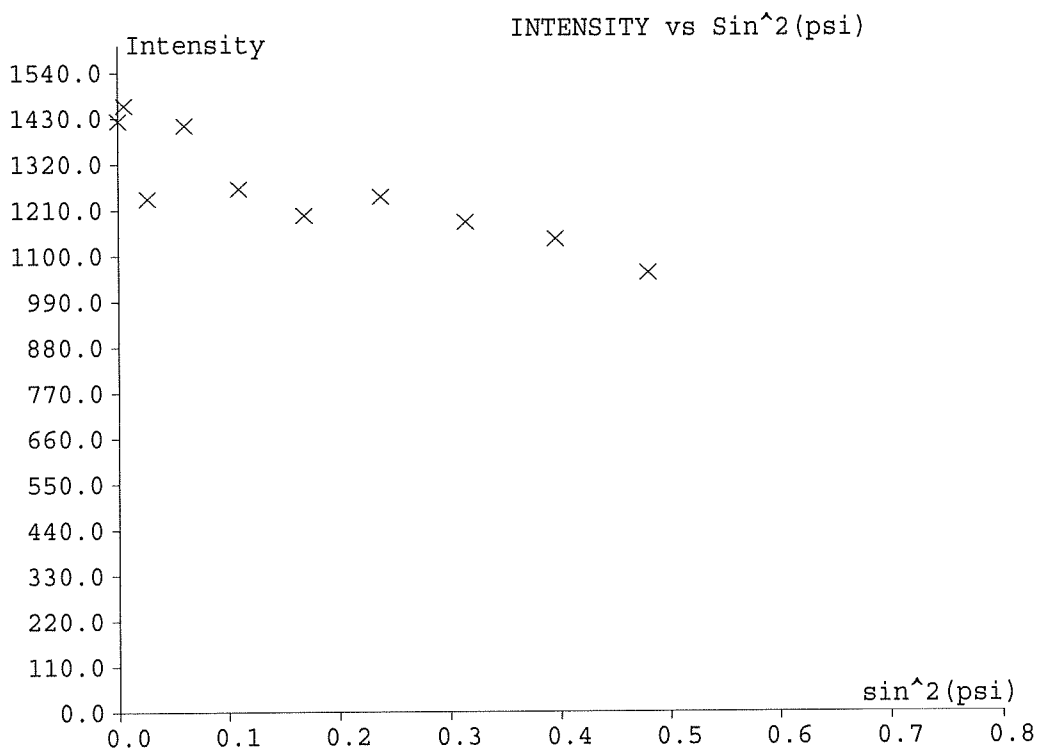
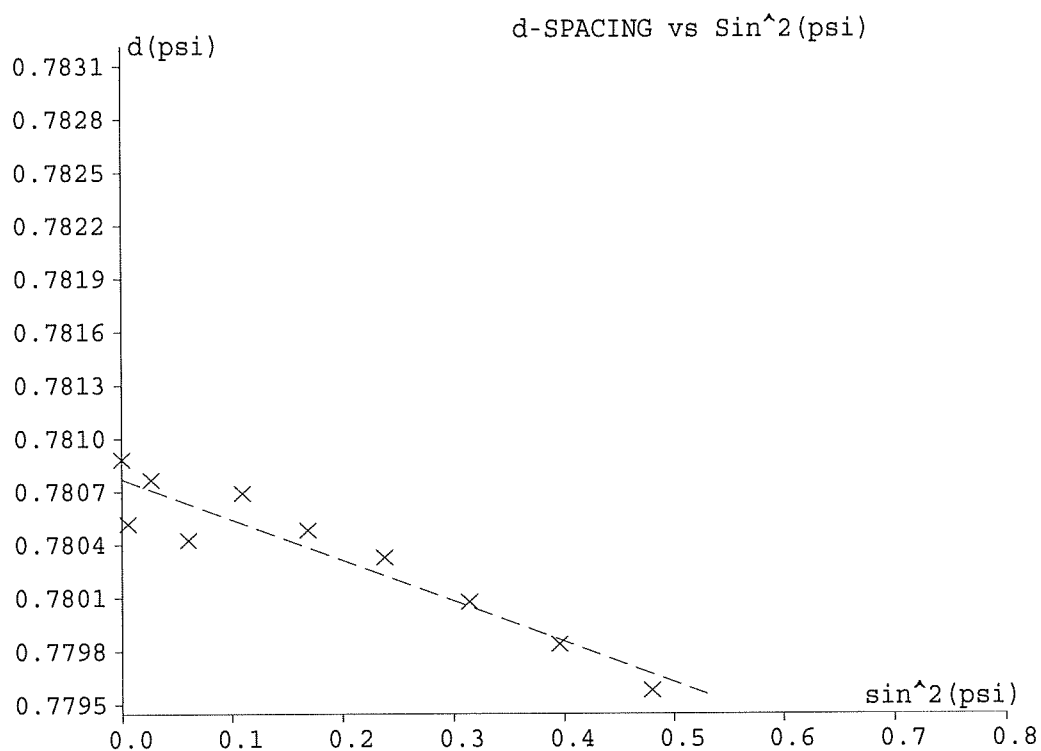
Counting Statistics Stress Error (+/-): 0.7 KSI 4.5 MPa  
Probable error.....(+/-): 2.9 KSI 20.3 MPa

File: S:\1005\2005\SBIR\50632\18440.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 13 / 0.10" from Edge of Hole / Hoop / ebm

*Residual Stress.....:	-23.3 KSI	-160.9 MPa
Counting Statistics Stress Error (+/-):	0.7 KSI	4.5 MPa
Probable error.....(+/-):	2.9 KSI	20.3 MPa



===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: S:\1005\2005\SBIR\50632\18441.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 13 / 0.15" from Edge of Hole / Hoop / ebm

Acquisition date & time: 6/01/2005 1:23pm

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 30.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A -3.15219E-07 B 0.000115735 C 0.0531817 D 147.9227

Psi	Sin <sup>2</sup> (psi)	Pk Chan	Intens	FWHM	Kalp	Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00021	157.08	1180.3	3.16	0.26594		161.64	0.780269	0.000026
5.0	0.00529	157.29	1253.8	3.01	0.26397		161.66	0.780253	0.000023
10.0	0.02526	158.07	1207.6	3.25	0.26798		161.71	0.780200	0.000024
15.0	0.05994	157.26	1339.5	3.08	0.26494		161.66	0.780255	0.000032
20.0	0.10800	156.86	1249.5	3.27	0.26713		161.63	0.780287	0.000026
25.0	0.16825	155.88	1166.2	3.05	0.26344		161.57	0.780355	0.000023
30.0	0.23799	156.38	1034.8	2.89	0.26116		161.60	0.780316	0.000024
35.0	0.31430	159.48	1140.6	3.11	0.26727		161.80	0.780097	0.000025
40.0	0.39767	159.62	1063.5	3.27	0.26954		161.81	0.780090	0.000024
45.0	0.48364	160.56	1098.2	2.96	0.26577		161.87	0.780018	0.000023

Fitted Delta D vs Sin<sup>2</sup>(psi) Data:

D Spacing Intercept.....: 0.780297  
Slope of Fitted Line.....: -0.0004591  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -4.7 KSI -32.3 MPa

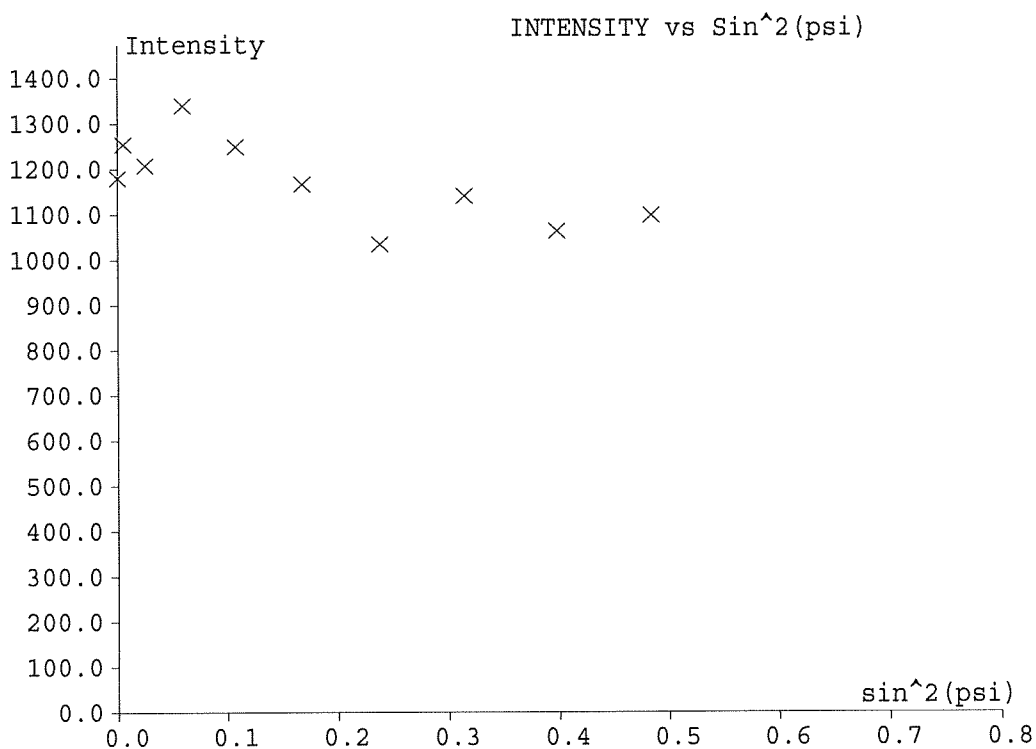
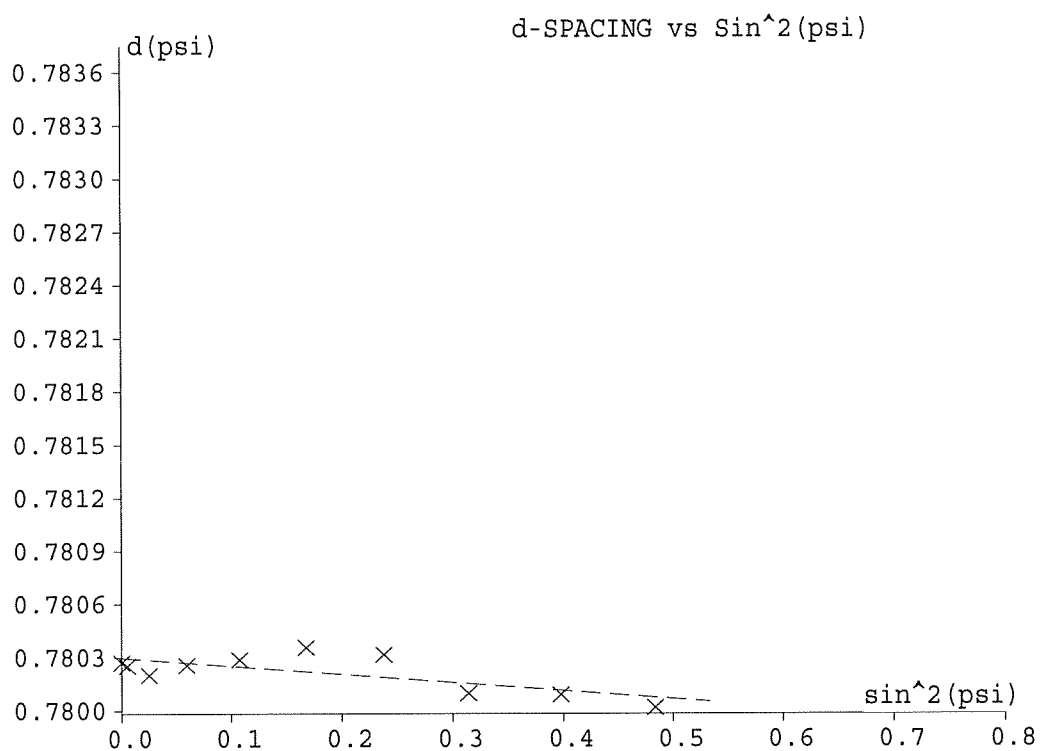
Counting Statistics Stress Error (+/-): 0.5 KSI 3.3 MPa  
Probable error.....(+/-): 1.6 KSI 11.1 MPa

File: S:\1005\2005\SBIR\50632\18441.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 13 / 0.15" from Edge of Hole / Hoop / ebm

*Residual Stress.....:	-4.7 KSI	-32.3 MPa
Counting Statistics Stress Error (+/-):	0.5 KSI	3.3 MPa
Probable error.....(+/-):	1.6 KSI	11.1 MPa



===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: S:\1005\2005\SBIR\50632\18442.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 14 / 0.05" from Edge of Hole / Hoop / ebm

Acquisition date & time: 6/01/2005 1:31pm

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 30.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A -3.15219E-07 B 0.000115735 C 0.0531817 D 147.9227

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.000006	145.36	1117.6	3.04	0.25456	160.88	0.781134	0.000027
5.0	0.00620	146.81	1044.9	3.33	0.25891	160.97	0.781028	0.000036
10.0	0.02739	146.51	1154.5	3.27	0.25816	160.95	0.781050	0.000032
15.0	0.06188	150.22	909.6	3.39	0.26248	161.19	0.780773	0.000036
20.0	0.11010	151.02	1009.4	3.69	0.26578	161.24	0.780717	0.000032
25.0	0.16922	153.73	927.8	3.77	0.26876	161.42	0.780519	0.000052
30.0	0.23705	158.44	917.9	3.54	0.27110	161.73	0.780177	0.000041
35.0	0.31215	163.63	997.5	3.39	0.27444	162.07	0.779810	0.000037
40.0	0.39315	167.82	965.9	3.41	0.27842	162.34	0.779521	0.000026
45.0	0.48122	164.94	1061.9	3.45	0.27636	162.15	0.779719	0.000026

Fitted Delta D vs Sin^2(psi) Data:

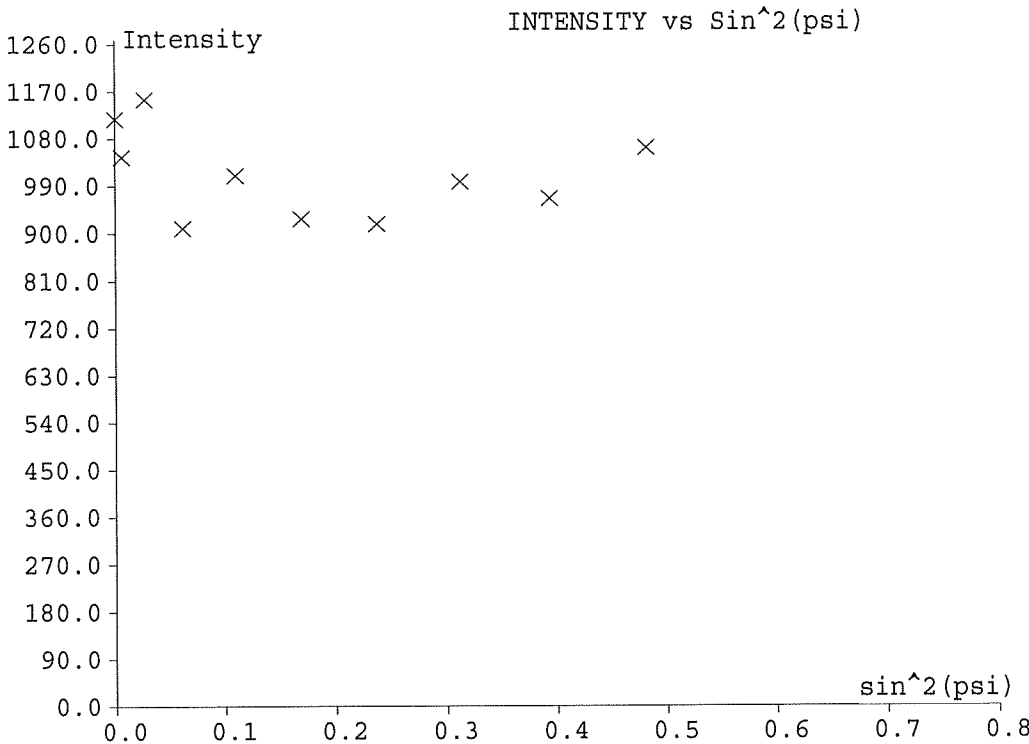
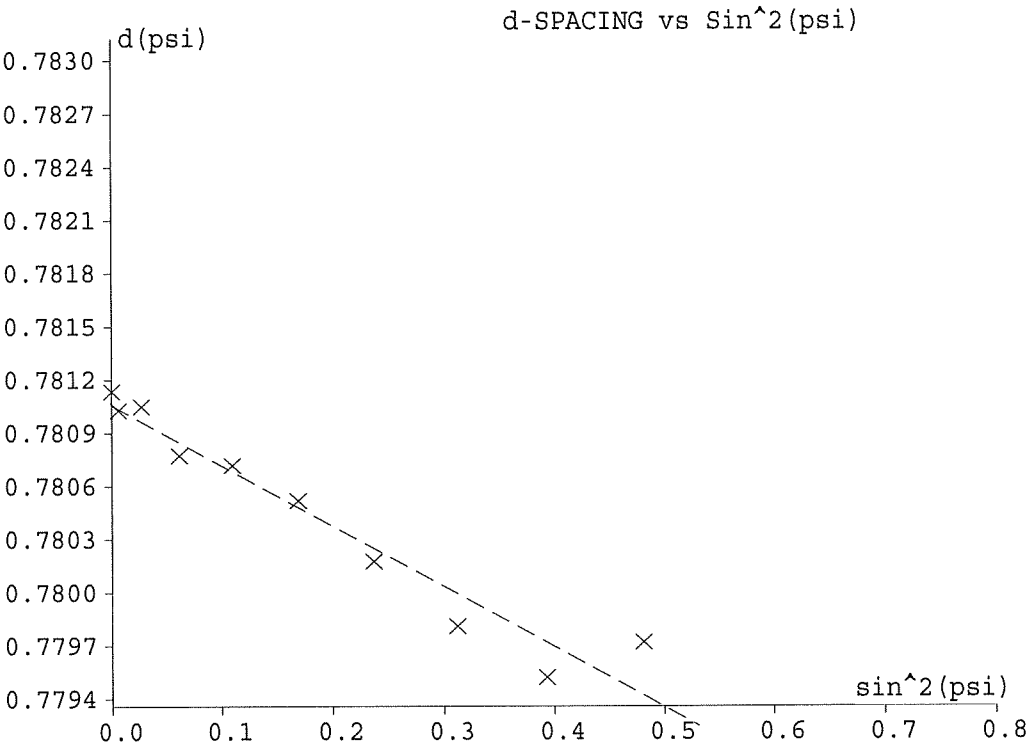
D Spacing Intercept.....: 0.781057  
Slope of Fitted Line.....: -0.003405  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -34.7 KSI -239.5 MPa

Counting Statistics Stress Error (+/-): 0.6 KSI 4.1 MPa  
Probable error.....(+/-): 3.1 KSI 21.2 MPa

File: S:\1005\2005\SBIR\50632\18442.STR  
Sample Description:  
SBIR / WP / CW Holes / AF Std. 14 / 0.05" from Edge of Hole / Hoop / ebm

\*Residual Stress.....: -34.7 KSI -239.5 MPa  
Counting Statistics Stress Error (+/-): 0.6 KSI 4.1 MPa  
Probable error.....(+/-): 3.1 KSI 21.2 MPa



===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: S:\1005\2005\SBIR\50632\18443.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 14 / 0.10" from Edge of Hole / Hoop / ebm

Acquisition date & time: 6/01/2005 1:39pm

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 30.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A -3.15219E-07 B 0.000115735 C 0.0531817 D 147.9227

Psi	Sin <sup>2</sup> (psi)	Pk Chan	Intens	FWHM	Kalp	Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00011	150.16	1248.6	2.96	0.25758		161.19	0.780772	0.000024
5.0	0.00567	152.85	1421.2	3.21	0.26302		161.37	0.780578	0.000028
10.0	0.02577	155.24	1171.5	3.17	0.26453		161.52	0.780403	0.000030
15.0	0.06108	153.14	1274.9	3.56	0.26662		161.38	0.780560	0.000034
20.0	0.11004	151.11	1332.6	3.13	0.26054		161.25	0.780705	0.000024
25.0	0.16903	154.06	1099.9	3.09	0.26250		161.45	0.780488	0.000026
30.0	0.23807	156.30	1150.3	3.33	0.26722		161.59	0.780328	0.000036
35.0	0.31409	159.85	1122.6	2.97	0.26543		161.83	0.780069	0.000030
40.0	0.39647	161.75	1137.1	3.07	0.26843		161.95	0.779936	0.000033
45.0	0.48170	164.03	1159.4	3.14	0.27144		162.10	0.779778	0.000022

Fitted Delta D vs Sin<sup>2</sup>(psi) Data:

D Spacing Intercept.....: 0.780686  
Slope of Fitted Line.....: -0.001798  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -18.3 KSI -126.5 MPa

Counting Statistics Stress Error (+/-): 0.5 KSI 3.7 MPa  
Probable error.....(+/-): 2.6 KSI 18.2 MPa

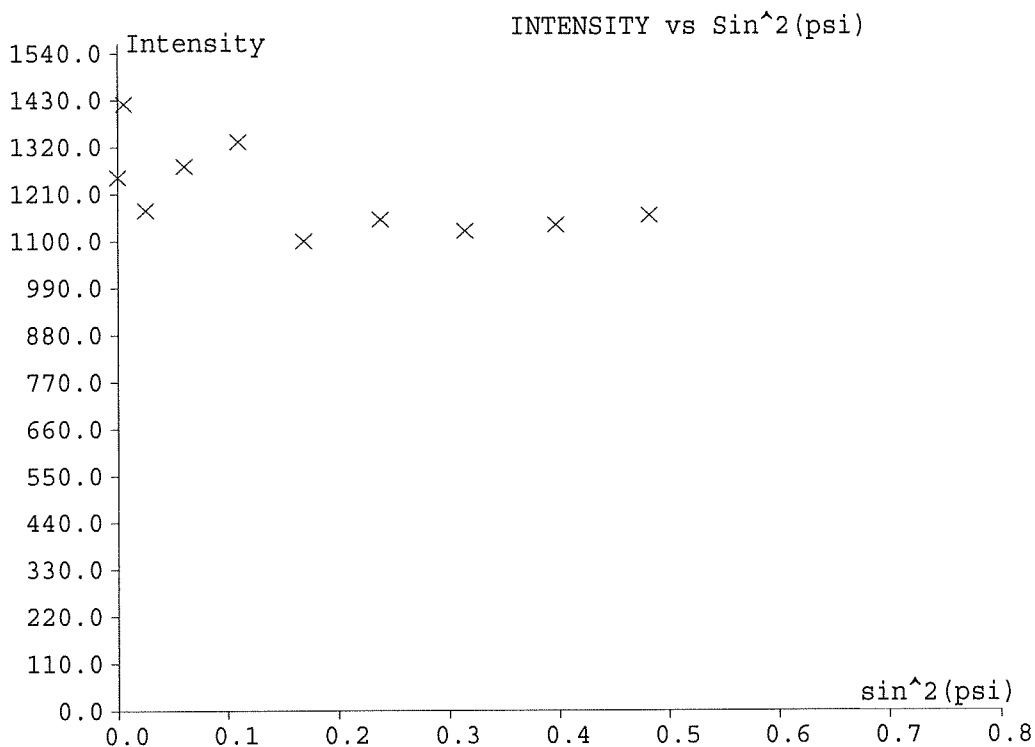
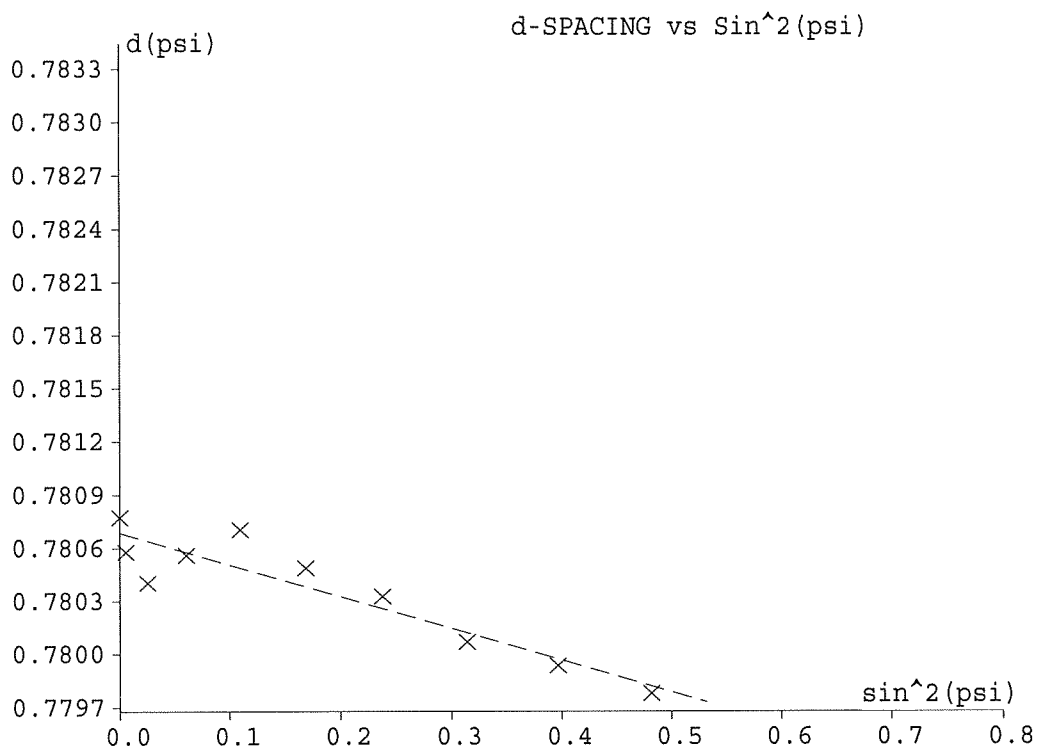


File: S:\1005\2005\SBIR\50632\18443.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 14 / 0.10" from Edge of Hole / Hoop / ebm

*Residual Stress.....:	-18.3 KSI	-126.5 MPa
Counting Statistics Stress Error (+/-):	0.5 KSI	3.7 MPa
Probable error.....(+/-):	2.6 KSI	18.2 MPa



===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: S:\1005\2005\SBIR\50632\18444.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 14 / 0.15" from Edge of Hole / Hoop / ebm

Acquisition date & time: 6/01/2005 1:47pm

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 30.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A -3.15219E-07 B 0.000115735 C 0.0531817 D 147.9227

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp	Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00014	152.41	1341.8	2.88	0.25780		161.34	0.780605	0.000032
5.0	0.00550	154.72	1409.5	3.08	0.26282		161.49	0.780439	0.000023
10.0	0.02569	155.68	1402.5	3.16	0.26472		161.55	0.780371	0.000027
15.0	0.06043	155.48	1241.9	3.25	0.26576		161.54	0.780387	0.000032
20.0	0.10938	152.91	1247.1	2.92	0.25899		161.37	0.780569	0.000021
25.0	0.16892	154.35	1198.3	3.28	0.26510		161.46	0.780469	0.000029
30.0	0.23840	155.58	1137.8	3.09	0.26372		161.55	0.780377	0.000029
35.0	0.31560	156.94	1066.1	2.79	0.25961		161.64	0.780273	0.000022
40.0	0.39875	157.64	1043.2	3.00	0.26407		161.68	0.780227	0.000029
45.0	0.48359	160.65	1198.9	2.96	0.26582		161.88	0.780012	0.000025

Fitted Delta D vs Sin^2(psi) Data:

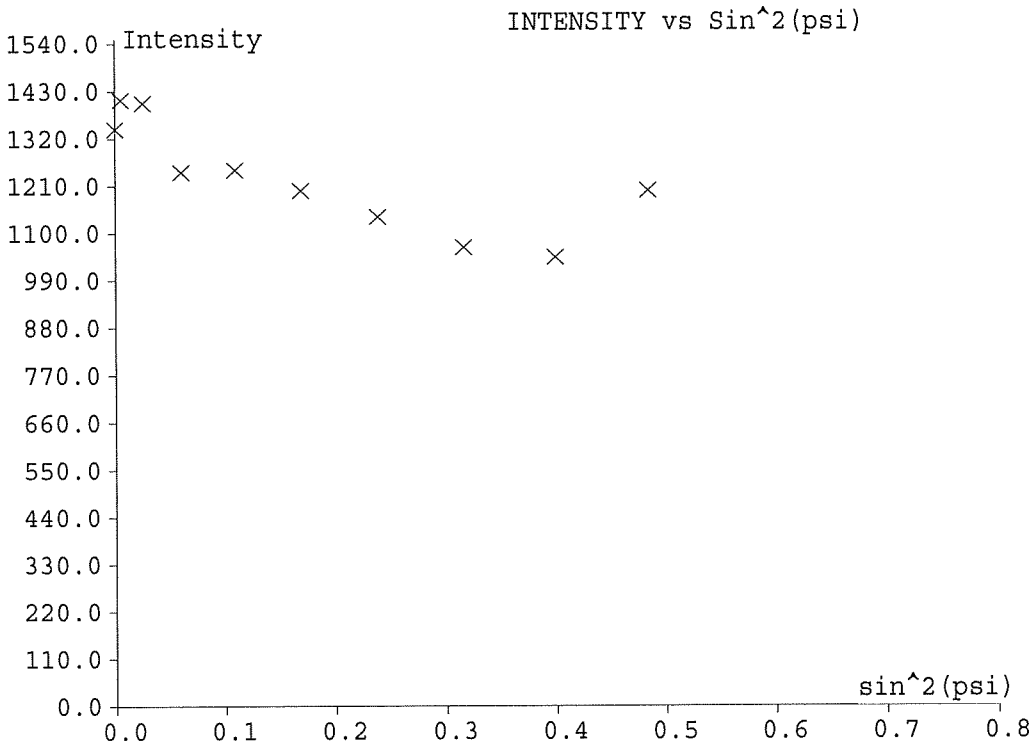
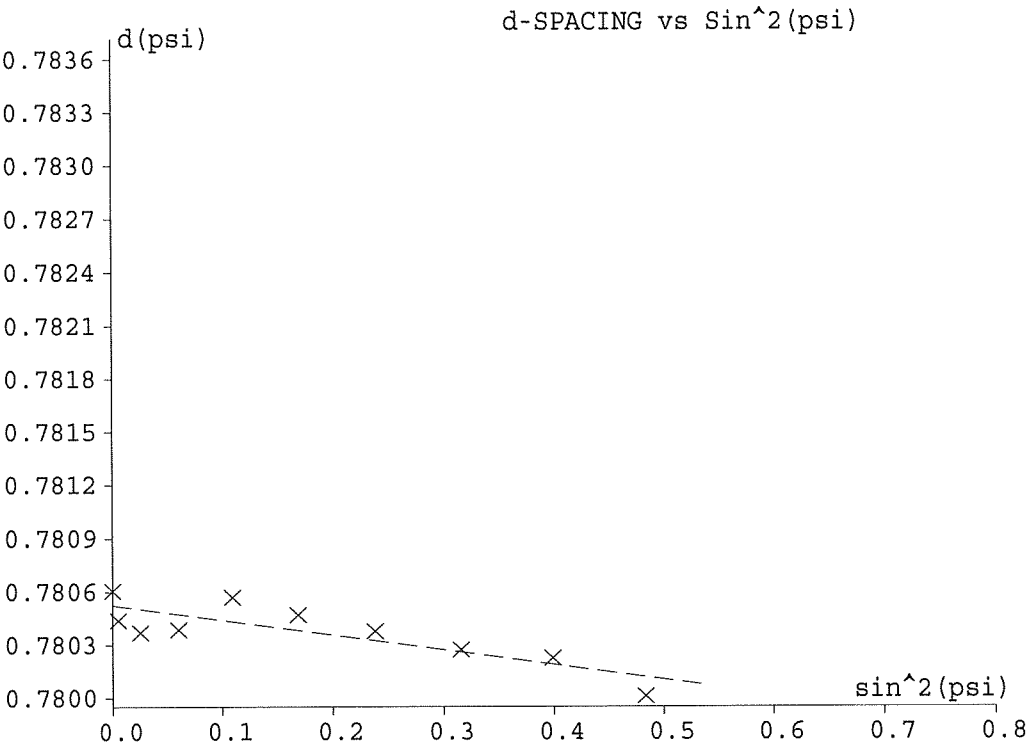
D Spacing Intercept.....: 0.780524  
Slope of Fitted Line.....: -0.0008376  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -8.6 KSI -59.0 MPa

Counting Statistics Stress Error (+/-): 0.5 KSI 3.6 MPa  
Probable error.....(+/-): 2.0 KSI 13.6 MPa

File: S:\1005\2005\SBIR\50632\18444.STR  
Sample Description:  
SBIR / WP / CW Holes / AF Std. 14 / 0.15" from Edge of Hole / Hoop / ebm

\*Residual Stress.....: -8.6 KSI -59.0 MPa  
Counting Statistics Stress Error (+/-): 0.5 KSI 3.6 MPa  
Probable error.....(+/-): 2.0 KSI 13.6 MPa



===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: S:\1005\2005\SBIR\50632\18445.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 15 / 0.05" from Edge of Hole / Hoop / ebm

Acquisition date & time: 6/01/2005 1:55pm

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 30.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A -3.15219E-07 B 0.000115735 C 0.0531817 D 147.9227

Psi	Sin <sup>2</sup> (psi)	Pk Chan	Intens	FWHM	Kalp	Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00008	147.47	861.4	3.47	0.26075		161.01	0.780979	0.000034
5.0	0.00615	147.33	1101.9	3.22	0.25839		161.00	0.780988	0.000031
10.0	0.02765	145.16	909.8	3.69	0.26066		160.86	0.781156	0.000043
15.0	0.06237	148.44	1061.5	3.41	0.26103		161.08	0.780906	0.000028
20.0	0.11105	148.34	859.0	3.25	0.25958		161.07	0.780913	0.000036
25.0	0.16694	159.07	803.8	3.74	0.27321		161.77	0.780134	0.000041
30.0	0.23804	156.41	923.1	3.64	0.27007		161.60	0.780323	0.000035
35.0	0.30959	168.54	798.1	3.51	0.28058		162.38	0.779473	0.000041
40.0	0.39555	163.50	921.8	3.53	0.27601		162.06	0.779820	0.000042
45.0	0.48022	166.72	987.6	3.46	0.27814		162.27	0.779597	0.000027

Fitted Delta D vs Sin<sup>2</sup>(psi) Data:

D Spacing Intercept.....: 0.781051  
Slope of Fitted Line.....: -0.003458  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -35.3 KSI -243.2 MPa

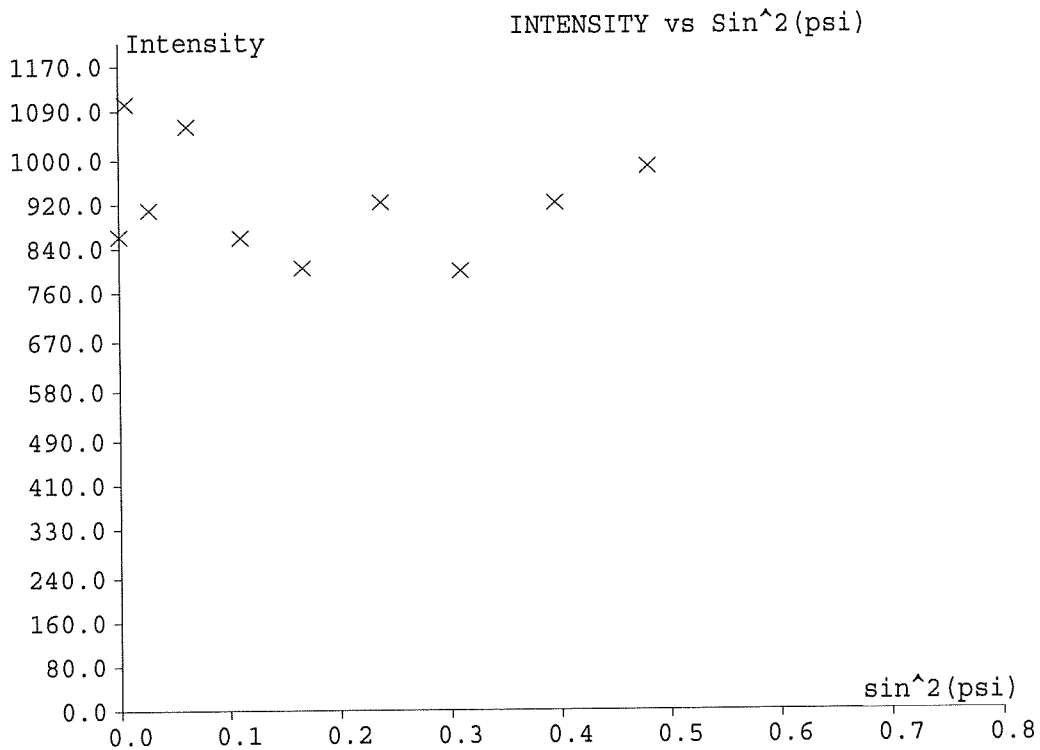
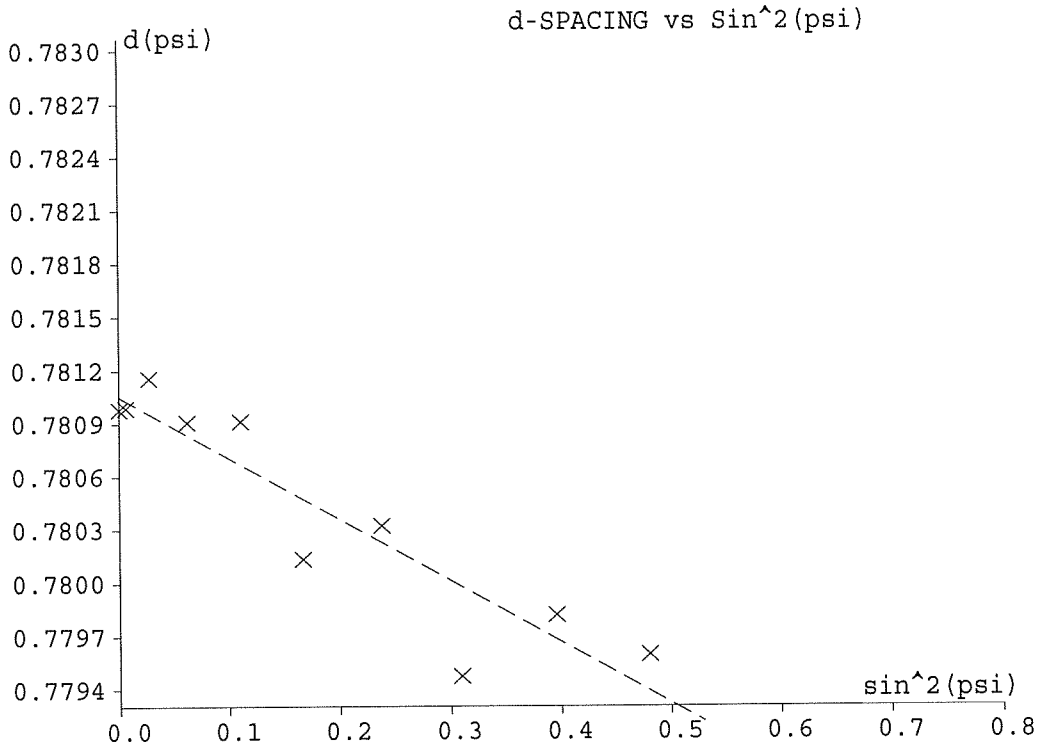
Counting Statistics Stress Error (+/-): 0.7 KSI 4.7 MPa  
Probable error.....(+/-): 5.3 KSI 36.3 MPa

File: S:\1005\2005\SBIR\50632\18445.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 15 / 0.05" from Edge of Hole / Hoop / ebm

*Residual Stress.....	-35.3 KSI	-243.2 MPa
Counting Statistics Stress Error (+/-):	0.7 KSI	4.7 MPa
Probable error.....(+/-):	5.3 KSI	36.3 MPa



===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: S:\1005\2005\SBIR\50632\18446.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 15 / 0.10" from Edge of Hole / Hoop / ebm

Acquisition date & time: 6/01/2005 2:03pm

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 30.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A -3.15219E-07 B 0.000115735 C 0.0531817 D 147.9227

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp	Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00010	149.49	1191.1	3.59	0.26355		161.14	0.780830	0.000039
5.0	0.00594	149.68	1373.7	3.35	0.26164		161.16	0.780813	0.000026
10.0	0.02704	148.42	1183.2	3.56	0.26236		161.07	0.780910	0.000029
15.0	0.06148	151.67	1148.8	3.28	0.26276		161.29	0.780665	0.000032
20.0	0.11023	150.58	1289.6	3.22	0.26121		161.22	0.780745	0.000026
25.0	0.16840	155.59	1134.4	3.42	0.26749		161.54	0.780381	0.000028
30.0	0.23831	155.81	1188.0	3.30	0.26651		161.56	0.780364	0.000036
35.0	0.31280	162.42	1096.6	3.56	0.27519		161.99	0.779896	0.000059
40.0	0.39757	159.85	1262.0	3.56	0.27269		161.82	0.780077	0.000026
45.0	0.48104	165.25	1144.7	3.35	0.27536		162.17	0.779697	0.000036

Fitted Delta D vs Sin^2(psi) Data:

D Spacing Intercept.....: 0.780870  
Slope of Fitted Line.....: -0.0024  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -24.5 KSI -168.8 MPa

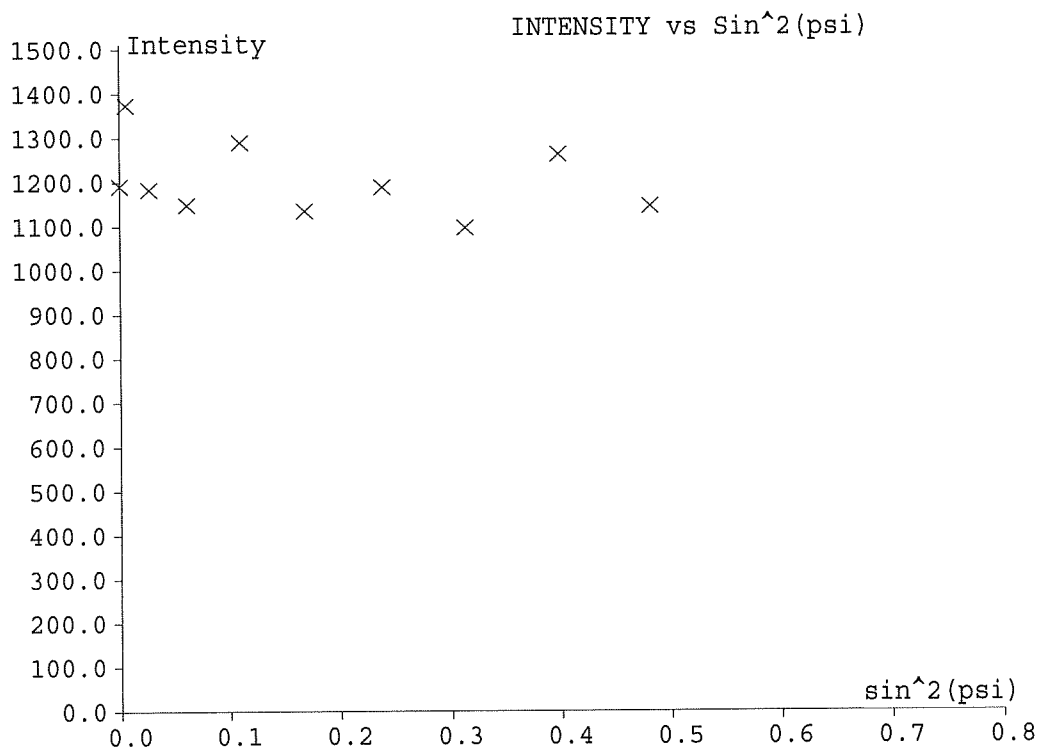
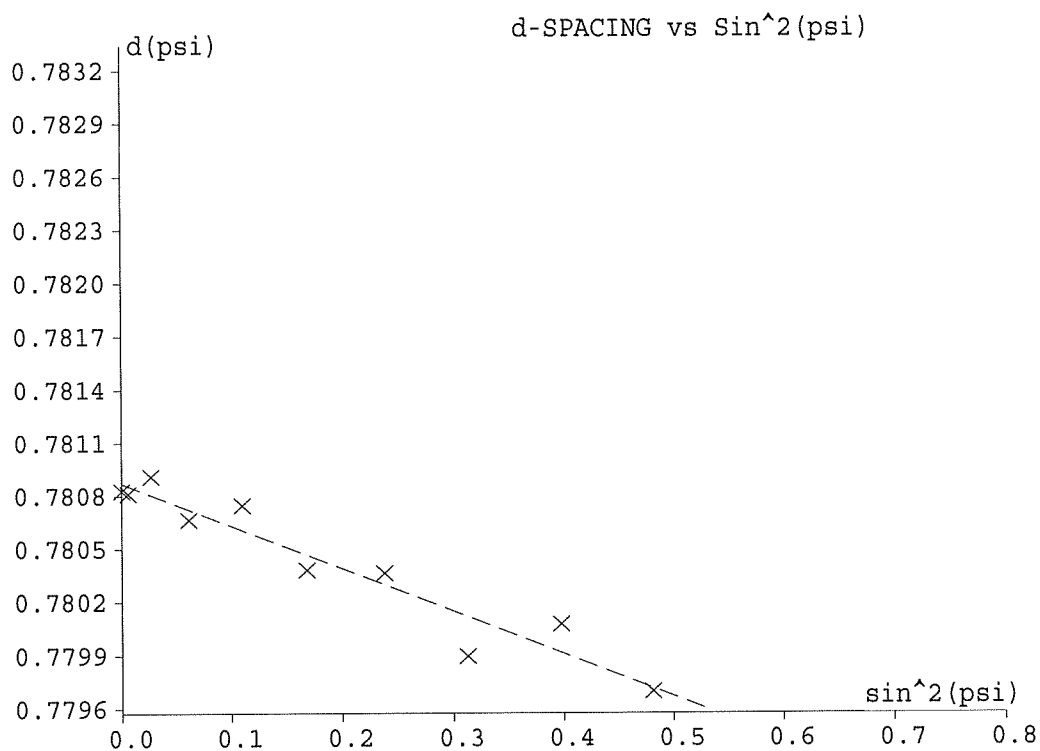
Counting Statistics Stress Error (+/-): 0.7 KSI 4.8 MPa  
Probable error.....(+/-): 2.5 KSI 17.1 MPa

File: S:\1005\2005\SBIR\50632\18446.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 15 / 0.10" from Edge of Hole / Hoop / ebm

*Residual Stress.....:	-24.5 KSI	-168.8 MPa
Counting Statistics Stress Error (+/-):	0.7 KSI	4.8 MPa
Probable error.....(+/-):	2.5 KSI	17.1 MPa



===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: S:\1005\2005\SBIR\50632\18447.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 15 / 0.15" from Edge of Hole / Hoop / ebm

Acquisition date & time: 6/01/2005 2:11pm

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 30.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A -3.15219E-07 B 0.000115735 C 0.0531817 D 147.9227

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp	Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00016	153.92	1206.5	3.21	0.26396		161.44	0.780499	0.000029
5.0	0.00551	154.60	1194.2	3.11	0.26312		161.48	0.780448	0.000032
10.0	0.02610	153.40	1182.8	3.12	0.26232		161.40	0.780536	0.000024
15.0	0.06068	154.52	1261.5	3.03	0.26204		161.48	0.780453	0.000023
20.0	0.10922	153.39	1258.8	3.11	0.26212		161.40	0.780536	0.000024
25.0	0.16904	154.01	1083.4	2.98	0.26090		161.45	0.780490	0.000021
30.0	0.23770	157.01	991.2	3.06	0.26446		161.64	0.780273	0.000027
35.0	0.31681	154.75	878.4	3.13	0.26360		161.49	0.780438	0.000026
40.0	0.40095	153.72	1145.7	3.05	0.26167		161.43	0.780512	0.000025
45.0	0.48237	162.84	1251.6	3.11	0.26989		162.02	0.779860	0.000022

Fitted Delta D vs Sin^2(psi) Data:

D Spacing Intercept.....: 0.780543  
Slope of Fitted Line.....: -0.0007637  
Material Stress Constant.....: 1.255E-07

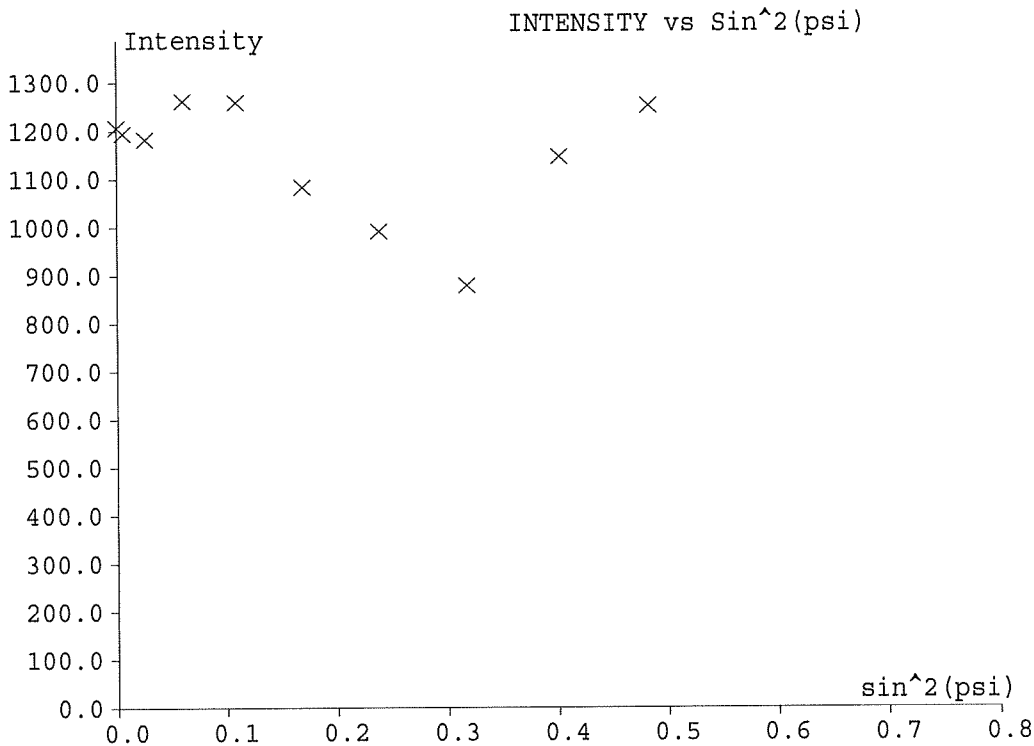
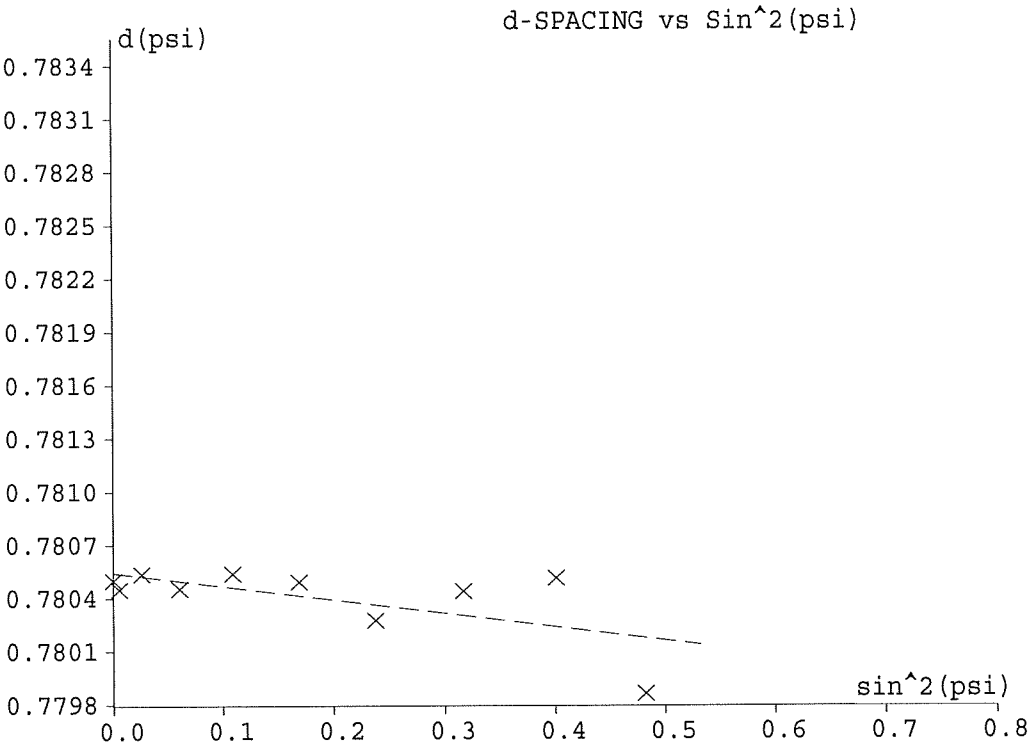
\*Residual Stress.....: -7.8 KSI -53.7 MPa

Counting Statistics Stress Error (+/-): 0.5 KSI 3.5 MPa  
Probable error.....(+/-): 3.3 KSI 22.8 MPa



File: S:\1005\2005\SBIR\50632\18447.STR  
Sample Description:  
SBIR / WP / CW Holes / AF Std. 15 / 0.15" from Edge of Hole / Hoop / ebm

\*Residual Stress.....: -7.8 KSI -53.7 MPa  
Counting Statistics Stress Error (+/-): 0.5 KSI 3.5 MPa  
Probable error.....(+/-): 3.3 KSI 22.8 MPa



===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: S:\1005\2005\SBIR\50632\18448.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 16 / 0.05" from Edge of Hole / Hoop / ebm

Acquisition date & time: 6/01/2005 2:19pm

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 30.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A -3.15219E-07 B 0.000115735 C 0.0531817 D 147.9227

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp	Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00008	147.27	1034.0	3.11	0.25707		161.00	0.780991	0.000031
5.0	0.00635	145.13	1158.9	3.40	0.25802		160.86	0.781155	0.000037
10.0	0.02731	146.96	1049.8	3.58	0.26124		160.98	0.781019	0.000042
15.0	0.06144	151.81	1062.9	3.41	0.26409		161.30	0.780656	0.000034
20.0	0.11035	150.27	1028.3	3.39	0.26252		161.20	0.780770	0.000034
25.0	0.16712	158.62	961.4	3.70	0.27251		161.74	0.780165	0.000041
30.0	0.23625	160.08	1038.0	3.43	0.27161		161.84	0.780059	0.000037
35.0	0.31380	160.47	1221.4	3.38	0.27143		161.86	0.780031	0.000033
40.0	0.39495	164.54	969.7	3.29	0.27396		162.13	0.779745	0.000042
45.0	0.47870	169.46	1049.3	3.60	0.28233		162.44	0.779412	0.000032

Fitted Delta D vs Sin^2(psi) Data:

D Spacing Intercept.....: 0.781012  
Slope of Fitted Line.....: -0.003403  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -34.7 KSI -239.4 MPa

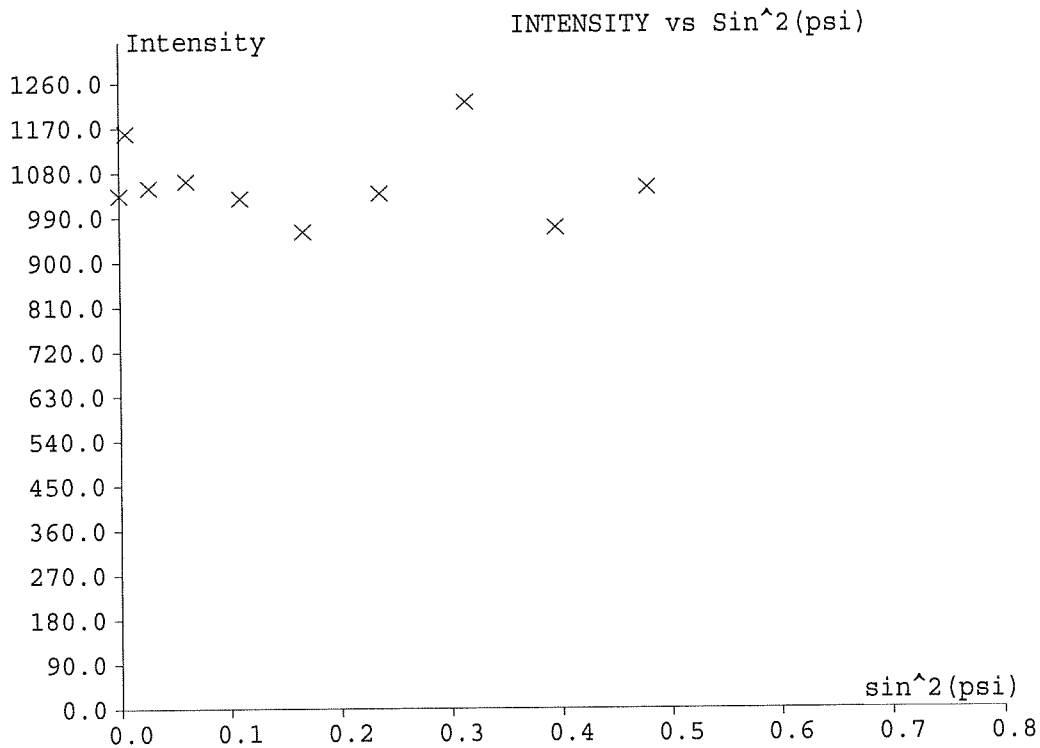
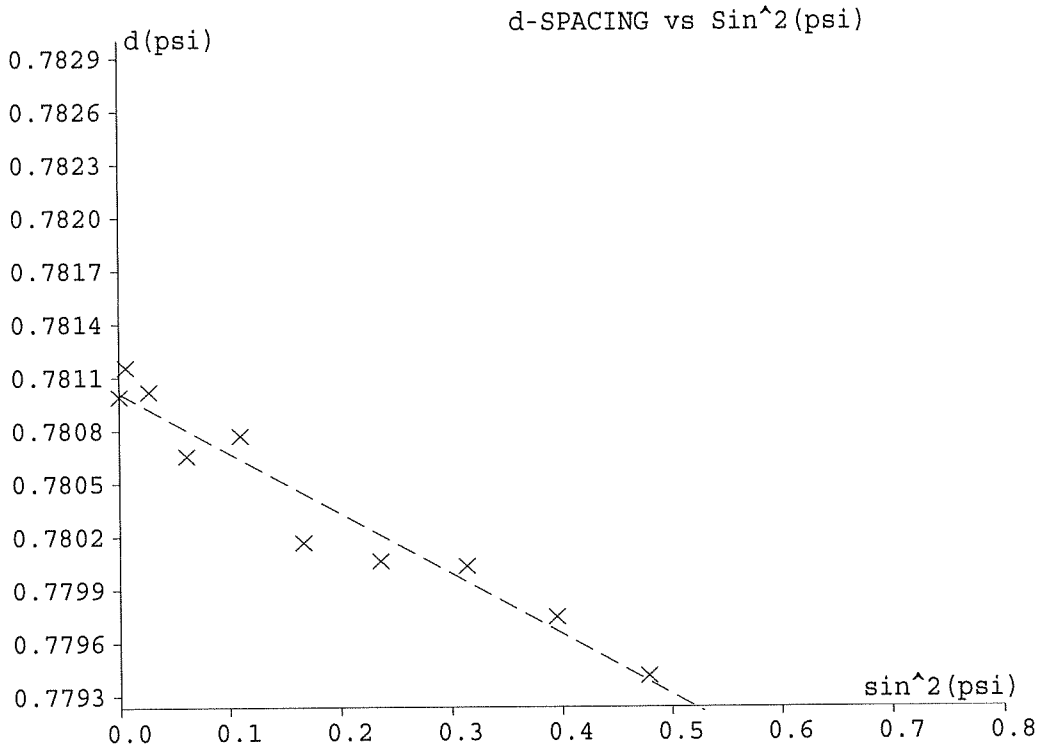
Counting Statistics Stress Error (+/-): 0.7 KSI 4.9 MPa  
Probable error.....(+/-): 3.1 KSI 21.2 MPa

File: S:\1005\2005\SBIR\50632\18448.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 16 / 0.05" from Edge of Hole / Hoop / ebm

*Residual Stress.....:	-34.7 KSI	-239.4 MPa
Counting Statistics Stress Error (+/-):	0.7 KSI	4.9 MPa
Probable error.....(+/-):	3.1 KSI	21.2 MPa



===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: S:\1005\2005\SBIR\50632\18449.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 16 / 0.10" from Edge of Hole / Hoop / ebm

Acquisition date & time: 6/01/2005 2:26pm

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 30.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A -3.15219E-07 B 0.000115735 C 0.0531817 D 147.9227

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp	Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00010	149.67	1438.6	3.31	0.26124		161.16	0.780814	0.000025
5.0	0.00607	148.26	1419.0	3.24	0.25938		161.06	0.780919	0.000027
10.0	0.02662	150.63	1295.1	3.32	0.26220		161.22	0.780743	0.000029
15.0	0.06130	152.29	1117.6	3.24	0.26292		161.33	0.780619	0.000031
20.0	0.10971	152.06	1138.3	3.36	0.26381		161.31	0.780637	0.000027
25.0	0.16769	157.27	1006.5	3.48	0.26955		161.65	0.780260	0.000038
30.0	0.23761	157.23	992.3	3.20	0.26664		161.65	0.780260	0.000029
35.0	0.31411	159.87	1389.2	3.26	0.26962		161.83	0.780072	0.000026
40.0	0.39860	157.93	1119.1	3.06	0.26517		161.70	0.780208	0.000032
45.0	0.48058	166.09	1014.7	3.53	0.27852		162.23	0.779641	0.000033

Fitted Delta D vs Sin^2(psi) Data:

D Spacing Intercept.....: 0.780812  
Slope of Fitted Line.....: -0.002193  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -22.4 KSI -154.3 MPa

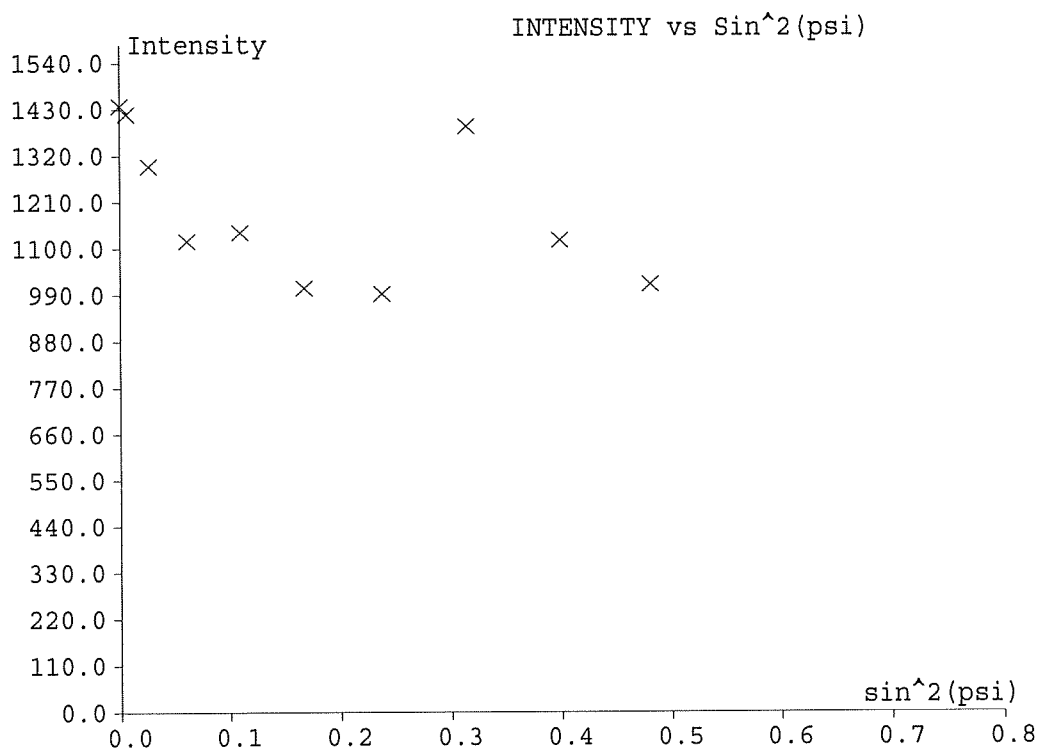
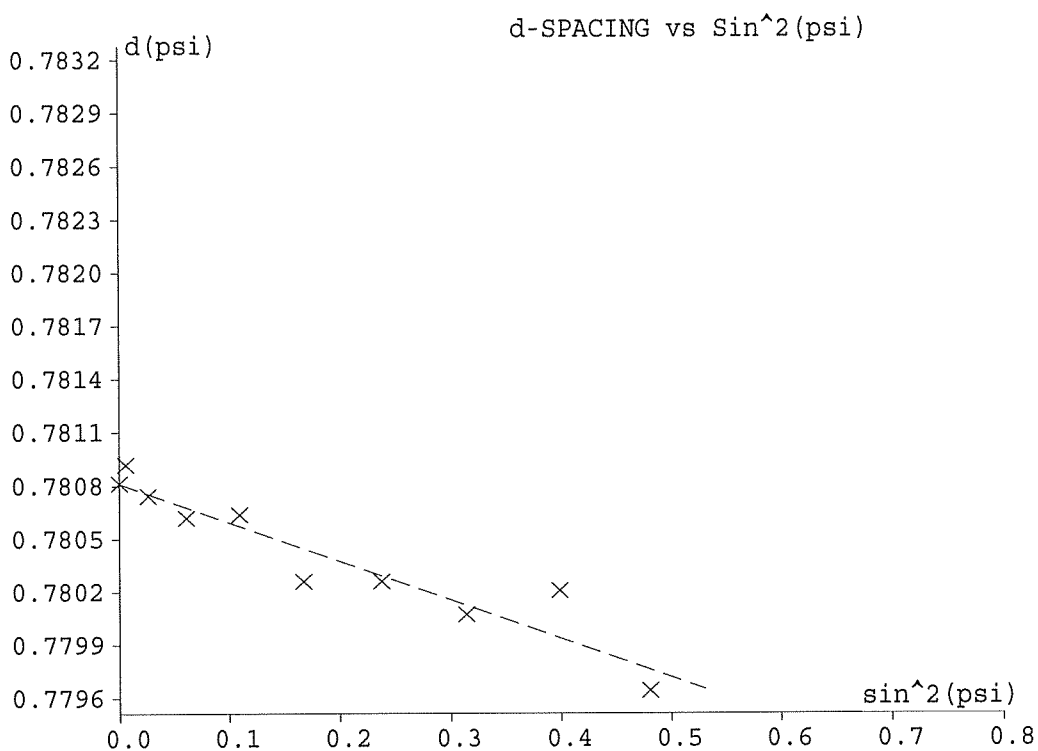
Counting Statistics Stress Error (+/-): 0.6 KSI 4.1 MPa  
Probable error.....(+/-): 2.7 KSI 18.5 MPa

File: S:\1005\2005\SBIR\50632\18449.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 16 / 0.10" from Edge of Hole / Hoop / ebm

*Residual Stress.....:	-22.4 KSI	-154.3 MPa
Counting Statistics Stress Error (+/-):	0.6 KSI	4.1 MPa
Probable error.....(+/-):	2.7 KSI	18.5 MPa



===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: S:\1005\2005\SBIR\50632\18450.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 16 / 0.15" from Edge of Hole / Hoop / ebm

Acquisition date & time: 6/01/2005 2:34pm

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 30.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A -3.15219E-07 B 0.000115735 C 0.0531817 D 147.9227

Psi	Sin <sup>2</sup> (psi)	Pk Chan	Intens	FWHM	Kalp	Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00014	152.48	1415.6	3.19	0.26247		161.34	0.780605	0.000028
5.0	0.00580	151.31	1206.3	3.08	0.25999		161.27	0.780689	0.000024
10.0	0.02606	153.67	1329.1	3.20	0.26357		161.42	0.780518	0.000024
15.0	0.06084	154.00	1376.0	3.28	0.26482		161.44	0.780494	0.000041
20.0	0.10922	153.43	1205.1	3.25	0.26396		161.40	0.780536	0.000029
25.0	0.16745	157.81	1246.4	3.34	0.26867		161.69	0.780220	0.000036
30.0	0.23874	154.90	1198.7	3.16	0.26411		161.50	0.780428	0.000021
35.0	0.31659	155.14	1260.9	3.00	0.26210		161.52	0.780408	0.000019
40.0	0.40060	154.33	1134.9	2.98	0.26119		161.47	0.780466	0.000020
45.0	0.48264	162.45	1288.5	3.54	0.27507		161.99	0.779894	0.000043

Fitted Delta D vs Sin<sup>2</sup>(psi) Data:

D Spacing Intercept.....: 0.780601  
Slope of Fitted Line.....: -0.0009698  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -9.9 KSI -68.3 MPa

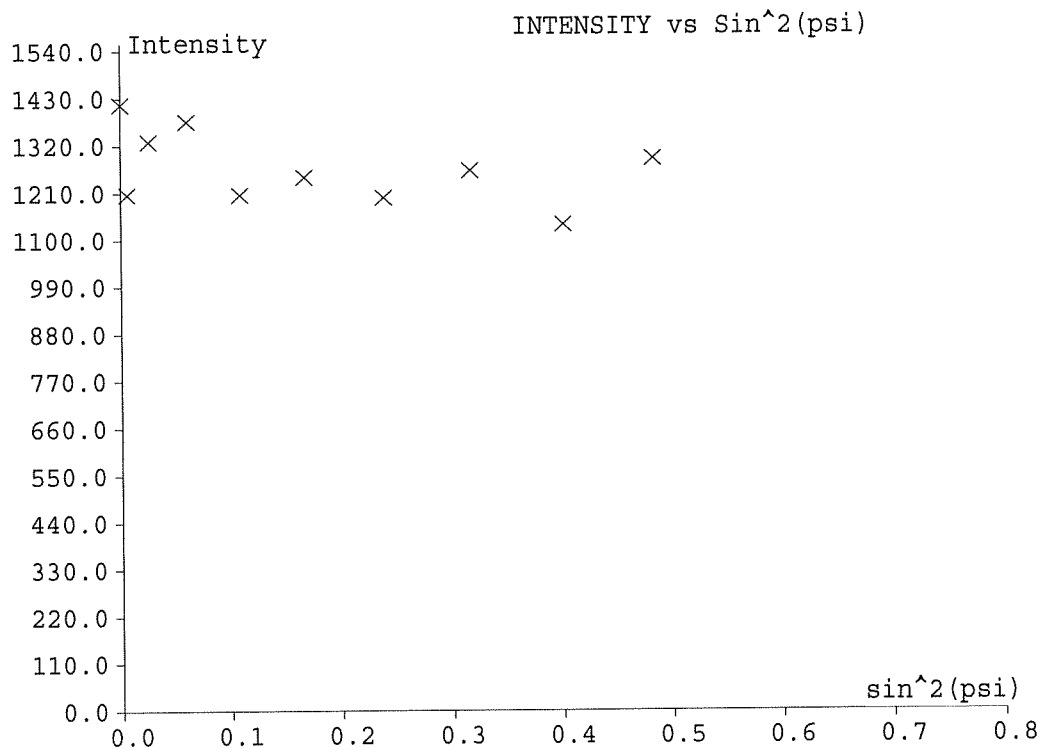
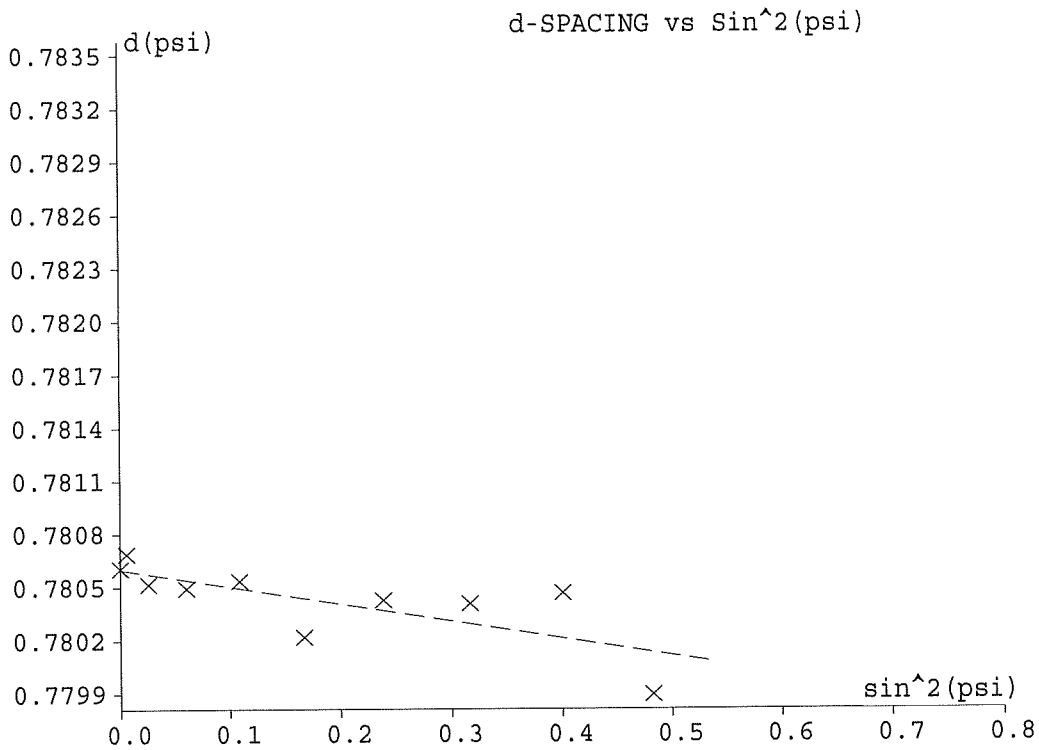
Counting Statistics Stress Error (+/-): 0.6 KSI 4.4 MPa  
Probable error.....(+/-): 3.1 KSI 21.6 MPa

File: S:\1005\2005\SBIR\50632\18450.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 16 / 0.15" from Edge of Hole / Hoop / ebm

*Residual Stress.....:	-9.9 KSI	-68.3 MPa
Counting Statistics Stress Error (+/-):	0.6 KSI	4.4 MPa
Probable error.....(+/-):	3.1 KSI	21.6 MPa



===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: S:\1005\2005\SBIR\50632\18451.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 17 / 0.05" from Edge of Hole / Hoop / ebm

Acquisition date & time: 6/01/2005 2:41pm

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 30.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A -3.15219E-07 B 0.000115735 C 0.0531817 D 147.9227

Psi	Sin <sup>2</sup> (psi)	Pk Chan	Intens	FWHM	Kalp	Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00010	149.90	1002.2	3.55	0.26359		161.17	0.780799	0.000039
5.0	0.00579	151.46	1129.4	3.36	0.26326		161.27	0.780682	0.000029
10.0	0.02673	150.05	1128.6	3.51	0.26337		161.18	0.780788	0.000042
15.0	0.06171	150.81	1074.0	3.26	0.26179		161.23	0.780729	0.000032
20.0	0.10856	155.27	1002.8	3.29	0.26593		161.52	0.780402	0.000034
25.0	0.16794	156.70	846.3	3.73	0.27101		161.61	0.780303	0.000039
30.0	0.23774	157.04	892.4	3.79	0.27174		161.64	0.780279	0.000035
35.0	0.31387	160.36	895.2	3.40	0.27158		161.86	0.780039	0.000035
40.0	0.39368	166.91	1123.8	3.63	0.28011		162.28	0.779586	0.000032
45.0	0.47961	167.74	1110.4	3.14	0.27440		162.34	0.779522	0.000023

Fitted Delta D vs Sin<sup>2</sup>(psi) Data:

D Spacing Intercept.....: 0.780800  
Slope of Fitted Line.....: -0.002711  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -27.7 KSI -190.8 MPa

Counting Statistics Stress Error (+/-): 0.6 KSI 4.3 MPa  
Probable error.....(+/-): 2.0 KSI 13.9 MPa

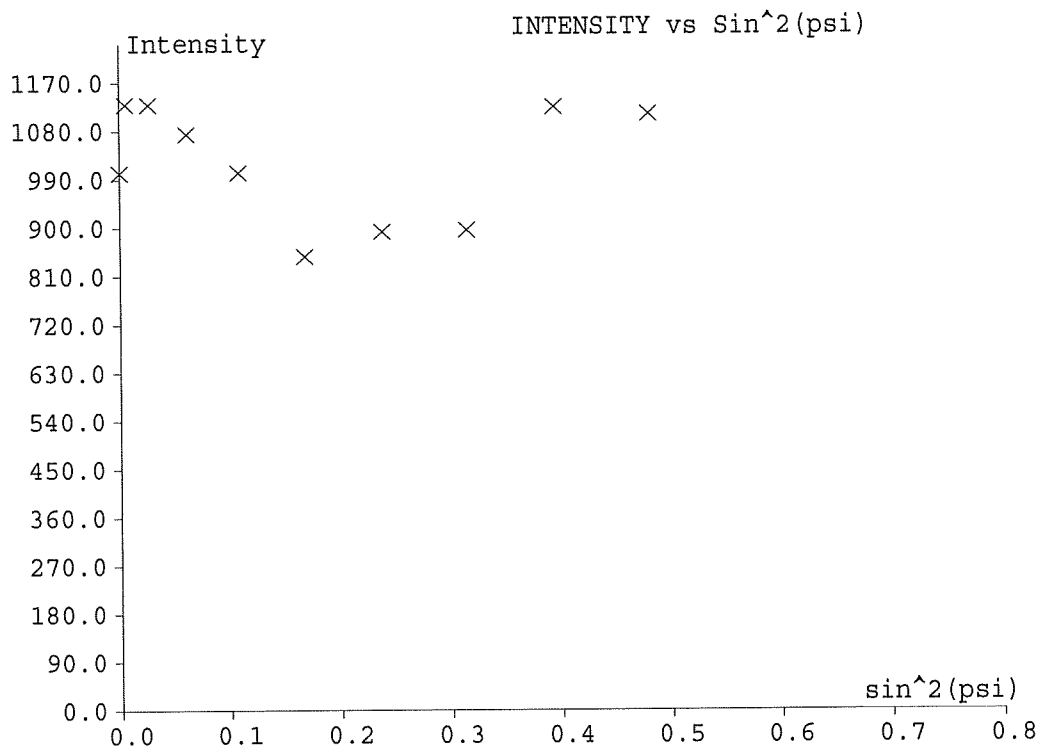
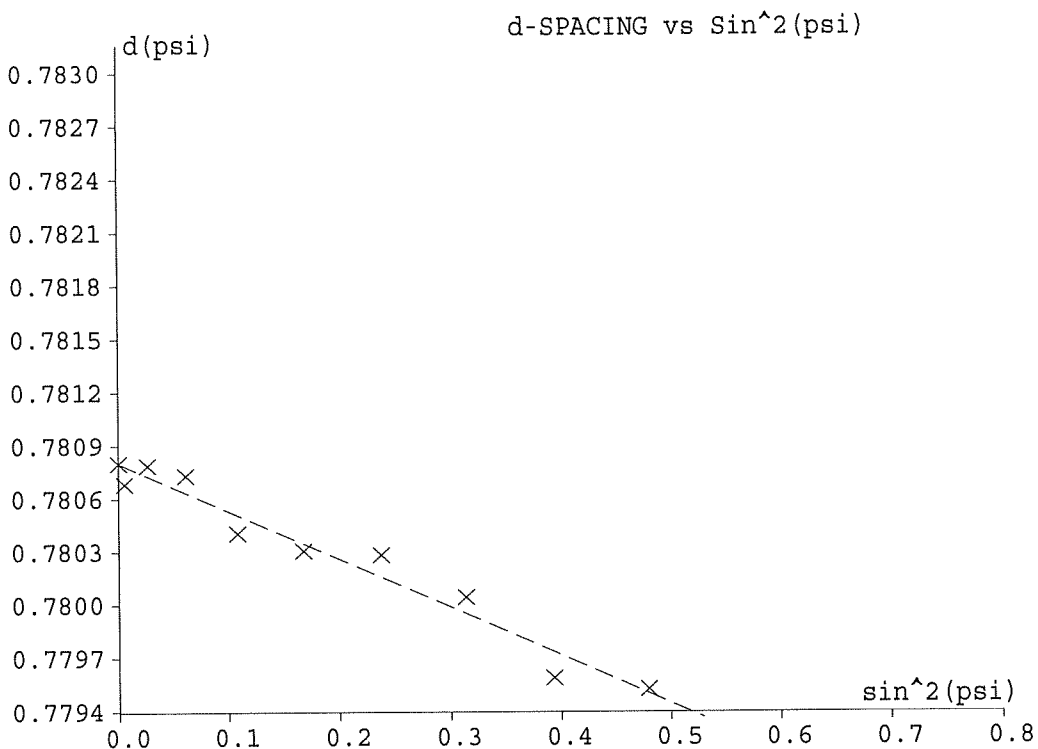


File: S:\1005\2005\SBIR\50632\18451.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 17 / 0.05" from Edge of Hole / Hoop / ebm

*Residual Stress.....:	-27.7 KSI	-190.8 MPa
Counting Statistics Stress Error (+/-):	0.6 KSI	4.3 MPa
Probable error.....(+/-):	2.0 KSI	13.9 MPa



===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: S:\1005\2005\SBIR\50632\18452.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 17 / 0.10" from Edge of Hole / Hoop / ebm

Acquisition date & time: 6/01/2005 2:49pm

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 30.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A -3.15219E-07 B 0.000115735 C 0.0531817 D 147.9227

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp	Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00016	154.39	1198.8	3.34	0.26566		161.47	0.780467	0.000029
5.0	0.00539	156.07	1446.6	3.28	0.26659		161.58	0.780345	0.000028
10.0	0.02577	155.29	1311.0	3.25	0.26563		161.53	0.780401	0.000044
15.0	0.06076	154.26	1356.7	3.23	0.26449		161.46	0.780475	0.000026
20.0	0.10856	155.24	1197.3	3.09	0.26351		161.53	0.780402	0.000028
25.0	0.16845	155.46	984.5	3.38	0.26700		161.54	0.780389	0.000041
30.0	0.23758	157.26	1217.9	3.05	0.26454		161.66	0.780255	0.000022
35.0	0.31593	156.28	1206.9	2.69	0.25656		161.60	0.780318	0.000019
40.0	0.39652	161.71	1187.1	3.35	0.27224		161.94	0.779943	0.000034
45.0	0.48269	162.28	1271.6	3.11	0.26947		161.98	0.779900	0.000028

Fitted Delta D vs Sin^2(psi) Data:

D Spacing Intercept.....: 0.780479  
Slope of Fitted Line.....: -0.001055  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -10.8 KSI -74.2 MPa

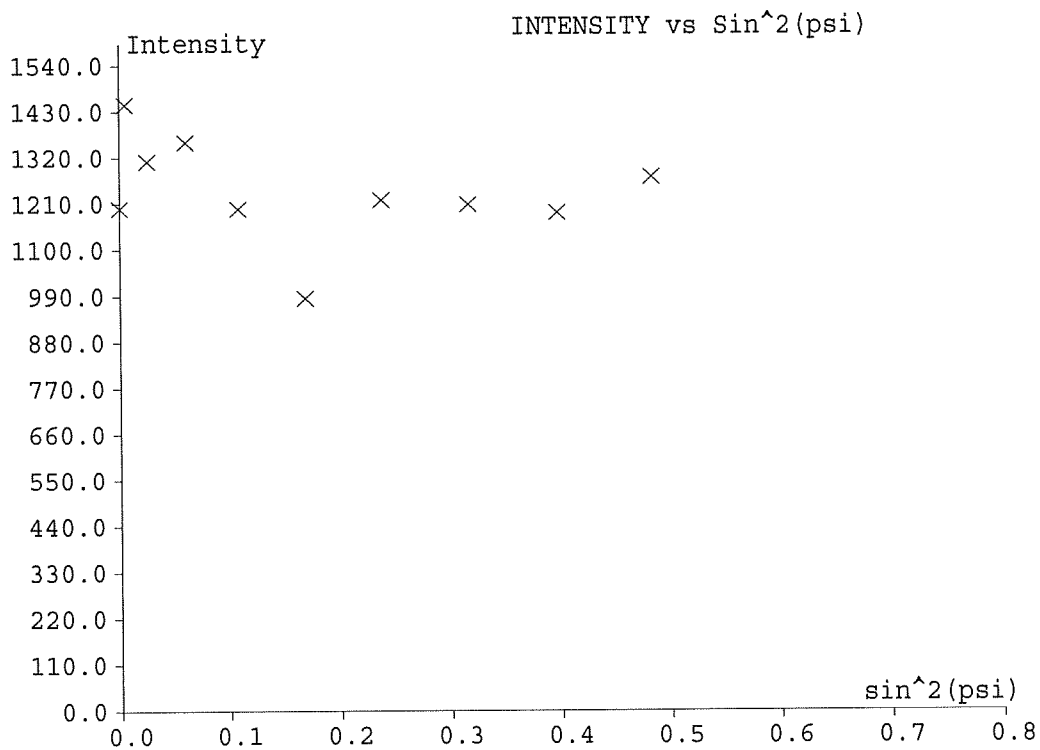
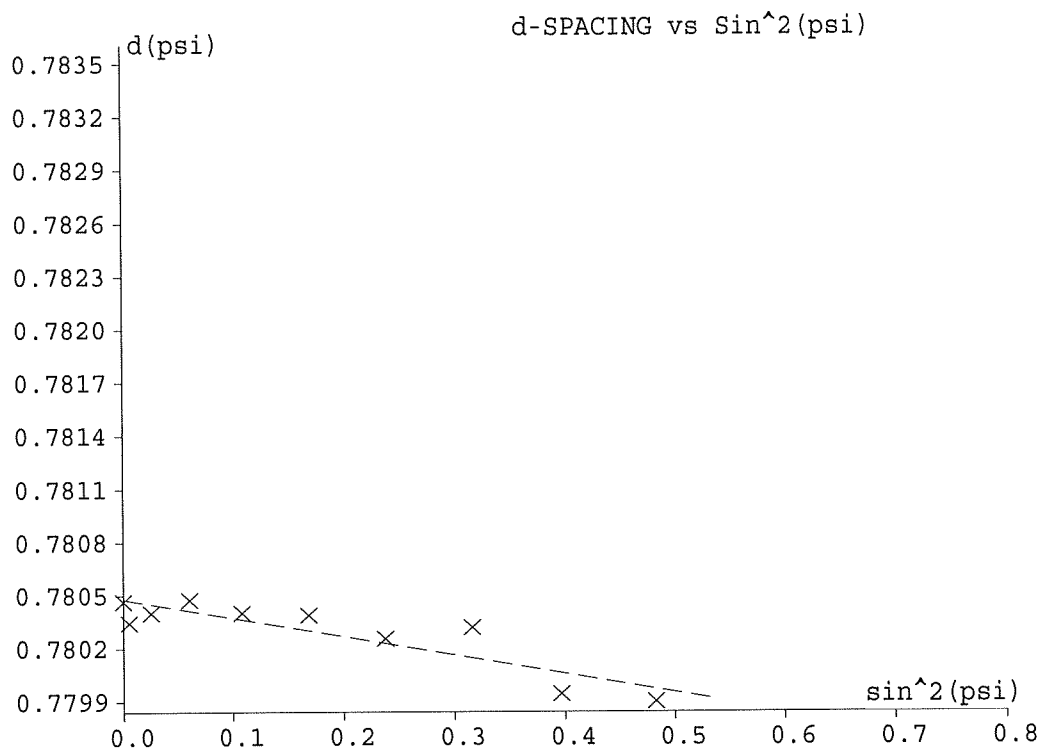
Counting Statistics Stress Error (+/-): 0.6 KSI 4.2 MPa  
Probable error.....(+/-): 2.0 KSI 13.7 MPa

File: S:\1005\2005\SBIR\50632\18452.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 17 / 0.10" from Edge of Hole / Hoop / ebm

*Residual Stress.....:	-10.8 KSI	-74.2 MPa
Counting Statistics Stress Error (+/-):	0.6 KSI	4.2 MPa
Probable error.....(+/-):	2.0 KSI	13.7 MPa



===== TEC Stress Analyzer v1.64 =====  
 ===== Residual Stress Analysis Report =====

File: S:\1005\2005\SBIR\50632\18453.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 17 / 0.15" from Edge of Hole / Hoop / ebm

Acquisition date & time: 6/01/2005 2:56pm

Material [hkl].....: Al 5083-H23 [333]  
 Depth.....: 0.0000000  
 Phi angle.....: 0.00  
 Collimator.....: Round\_4mm  
 Bracket.....: 160s  
 Peak Bounding Range [percent].....: 20  
 X-ray Target Description and Wavelength: copper 1.54056  
 PSI Oscillation Angle Range.....: 2.00  
 Spectra count time (PSI=0).....: 30.0  
 High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
 ADC Channels Full Scale.....: 256  
 Detector Calibration Coefficients:  
 A -3.15219E-07 B 0.000115735 C 0.0531817 D 147.9227

Psi	Sin <sup>2</sup> (psi)	Pk Chan	Intens	FWHM	Kalp	Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00024	159.21	1236.8	3.14	0.26749		161.78	0.780117	0.000026
5.0	0.00514	159.06	1270.5	3.09	0.26660		161.77	0.780127	0.000025
10.0	0.02521	158.37	1309.6	3.13	0.26663		161.73	0.780177	0.000028
15.0	0.06041	155.51	1128.5	3.12	0.26408		161.54	0.780382	0.000026
20.0	0.10769	157.70	1179.0	3.08	0.26540		161.69	0.780224	0.000022
25.0	0.16780	156.98	974.0	3.24	0.26699		161.64	0.780279	0.000033
30.0	0.23778	156.77	1046.5	2.80	0.25963		161.63	0.780285	0.000025
35.0	0.31531	157.51	1177.4	2.85	0.26131		161.68	0.780233	0.000020
40.0	0.39969	155.95	1179.0	2.97	0.26235		161.57	0.780349	0.000022
45.0	0.48484	158.45	1473.3	2.96	0.26410		161.74	0.780168	0.000019

Fitted Delta D vs Sin<sup>2</sup>(psi) Data:

D Spacing Intercept.....: 0.780208  
 Slope of Fitted Line.....: 0.0001447  
 Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: 1.5 KSI 10.2 MPa

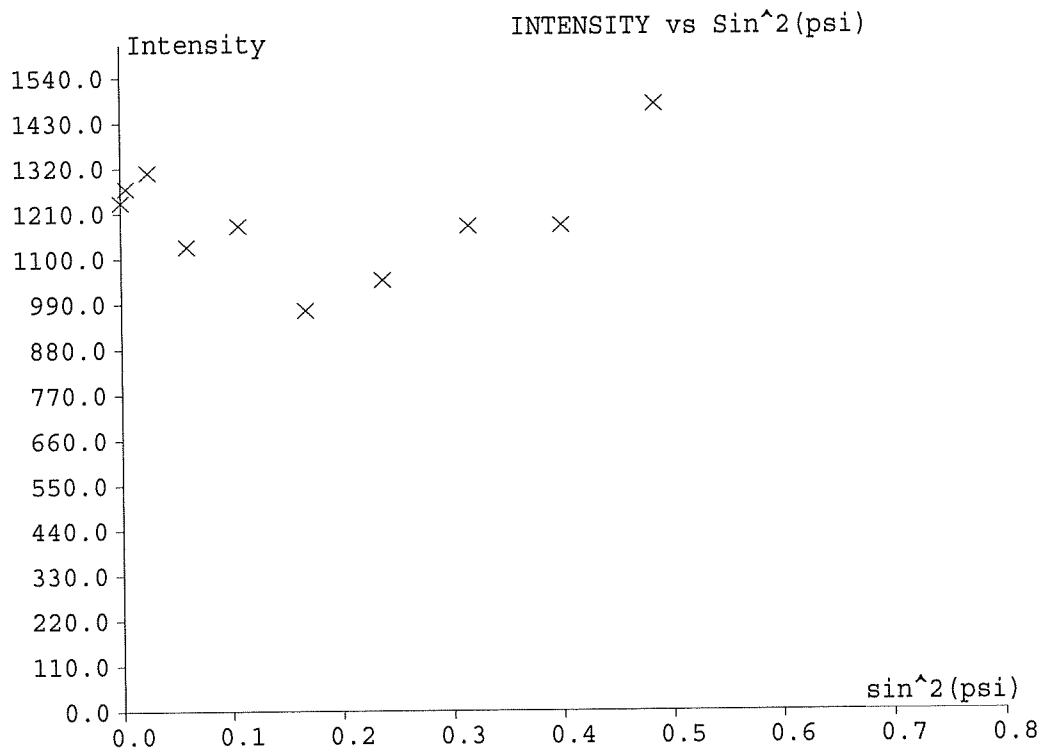
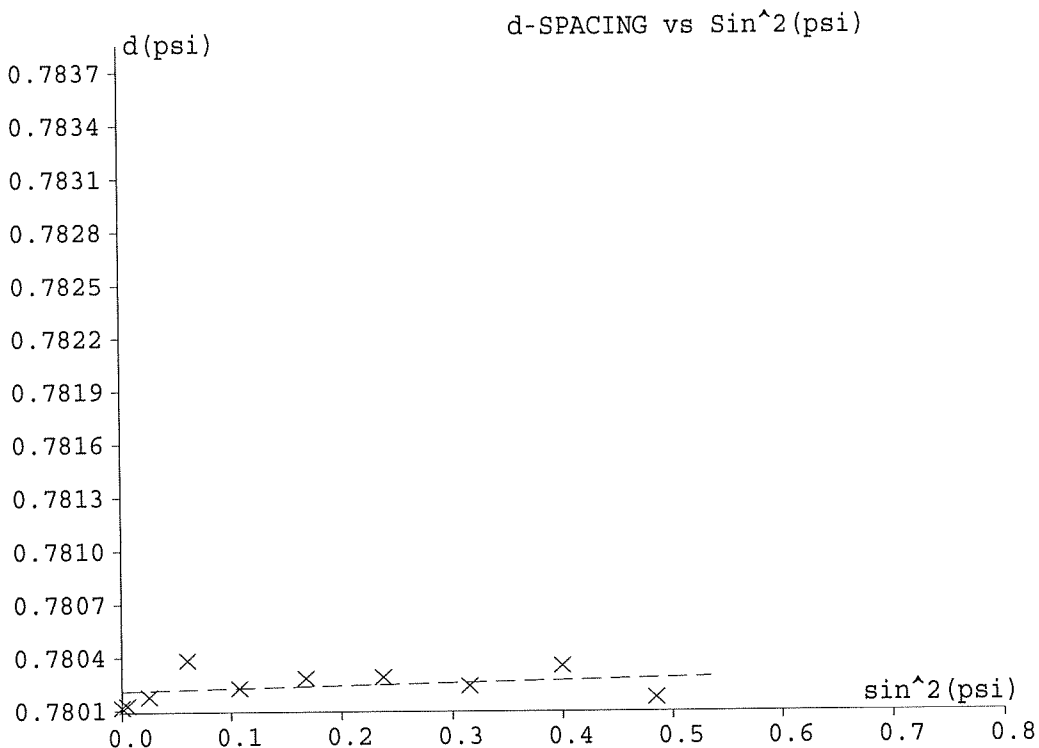
Counting Statistics Stress Error (+/-): 0.4 KSI 3.1 MPa  
 Probable error.....(+/-): 1.8 KSI 12.4 MPa

File: S:\1005\2005\SBIR\50632\18453.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 17 / 0.15" from Edge of Hole / Hoop / ebm

*Residual Stress.....:	1.5 KSI	10.2 MPa
Counting Statistics Stress Error (+/-):	0.4 KSI	3.1 MPa
Probable error.....(+/-):	1.8 KSI	12.4 MPa



===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: S:\1005\2005\SBIR\50632\18454.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 18 / 0.05" from Edge of Hole / Hoop / ebm

Acquisition date & time: 6/01/2005 3:04pm

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 30.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A -3.15219E-07 B 0.000115735 C 0.0531817 D 147.9227

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp	Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00006	146.01	853.9	3.22	0.25730		160.92	0.781087	0.000044
5.0	0.00627	146.01	1131.7	3.12	0.25611		160.92	0.781086	0.000027
10.0	0.02743	146.26	947.1	3.34	0.25851		160.93	0.781069	0.000035
15.0	0.06248	148.08	932.9	3.67	0.26300		161.05	0.780936	0.000035
20.0	0.10949	152.71	847.4	3.64	0.26681		161.35	0.780592	0.000052
25.0	0.16854	155.28	863.1	3.63	0.26901		161.52	0.780405	0.000069
30.0	0.23749	157.55	814.4	3.78	0.27212		161.67	0.780243	0.000033
35.0	0.31078	166.32	782.1	4.03	0.28229		162.24	0.779629	0.000044
40.0	0.39410	166.16	1038.9	3.71	0.28004		162.23	0.779638	0.000040
45.0	0.47838	170.02	1050.0	3.54	0.28235		162.48	0.779374	0.000027

Fitted Delta D vs Sin^2(psi) Data:

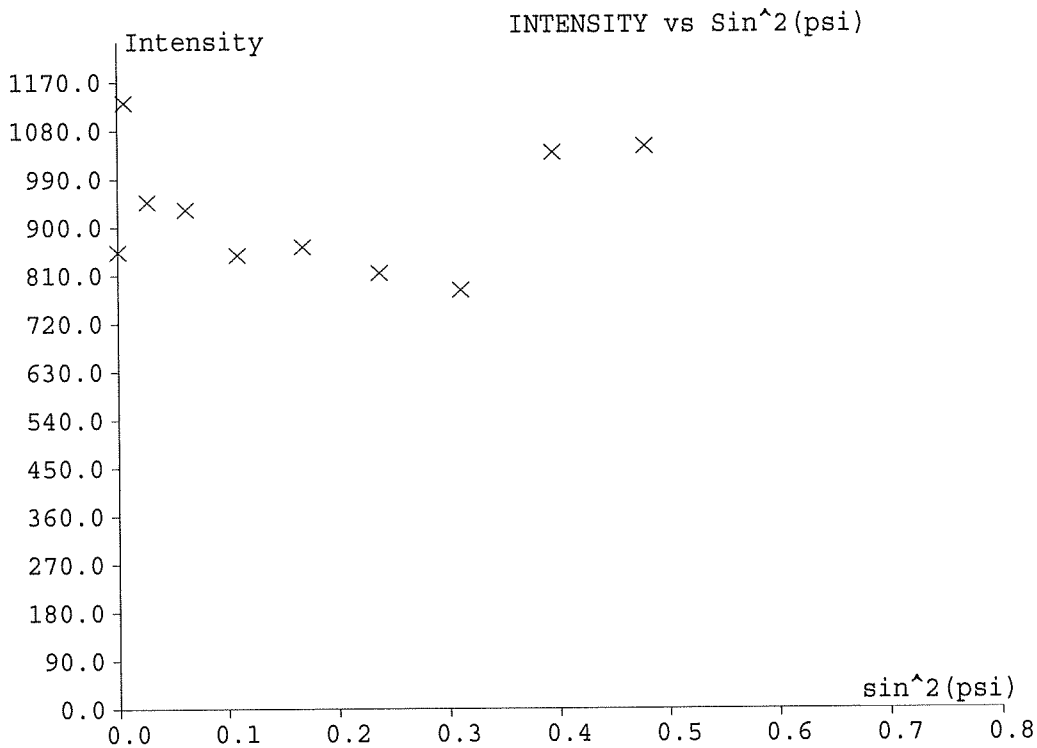
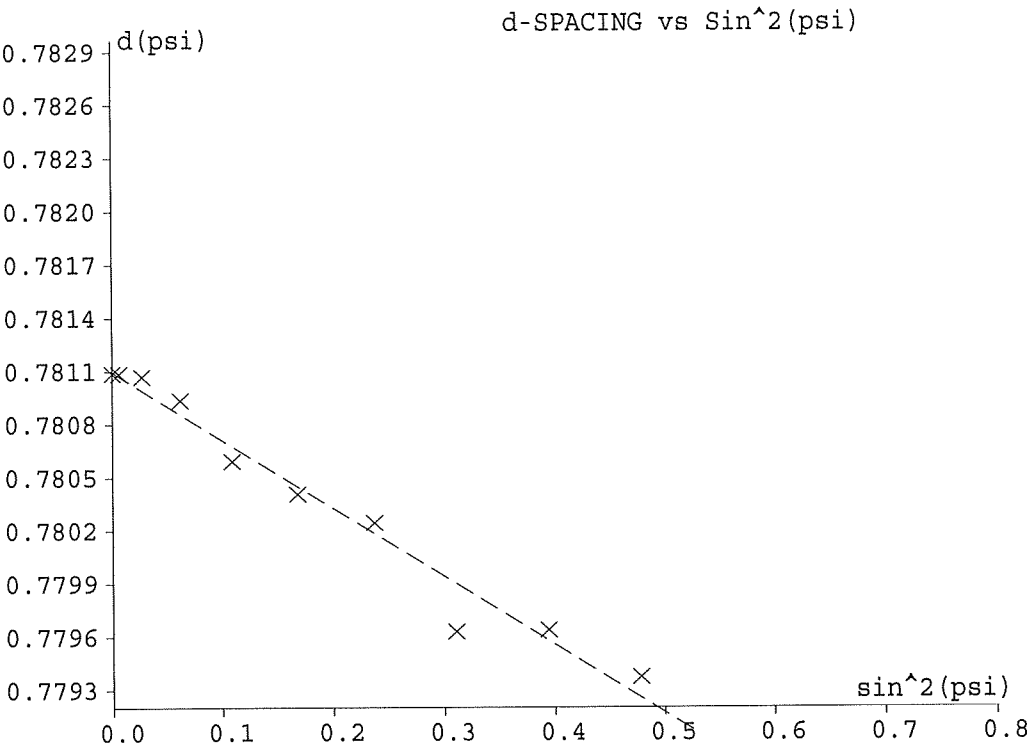
D Spacing Intercept.....: 0.781097  
Slope of Fitted Line.....: -0.003849  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -39.3 KSI -270.7 MPa

Counting Statistics Stress Error (+/-): 0.7 KSI 4.8 MPa  
Probable error.....(+/-): 2.4 KSI 16.6 MPa

File: S:\1005\2005\SBIR\50632\18454.STR  
Sample Description:  
SBIR / WP / CW Holes / AF Std. 18 / 0.05" from Edge of Hole / Hoop / ebm

\*Residual Stress.....: -39.3 KSI -270.7 MPa  
Counting Statistics Stress Error (+/-): 0.7 KSI 4.8 MPa  
Probable error.....(+/-): 2.4 KSI 16.6 MPa



===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: S:\1005\2005\SBIR\50632\18455.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 18 / 0.10" from Edge of Hole / Hoop / ebm

Acquisition date & time: 6/01/2005 3:12pm

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 30.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A -3.15219E-07 B 0.000115735 C 0.0531817 D 147.9227

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp	Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00010	149.85	1271.0	3.33	0.26161		161.17	0.780800	0.000027
5.0	0.00598	149.25	1452.0	3.19	0.25972		161.13	0.780844	0.000029
10.0	0.02640	151.80	1304.5	3.28	0.26287		161.30	0.780656	0.000028
15.0	0.06182	150.47	1063.1	3.53	0.26399		161.21	0.780757	0.000040
20.0	0.10899	154.04	980.5	3.17	0.26356		161.45	0.780490	0.000027
25.0	0.16849	155.35	1065.7	3.18	0.26477		161.53	0.780395	0.000035
30.0	0.23806	156.32	1074.2	3.26	0.26655		161.59	0.780326	0.000034
35.0	0.31324	161.53	1151.3	3.29	0.27135		161.93	0.779955	0.000033
40.0	0.39622	162.22	1166.9	3.14	0.26986		161.98	0.779905	0.000029
45.0	0.48193	163.64	1203.4	3.18	0.27170		162.07	0.779806	0.000023

Fitted Delta D vs Sin^2(psi) Data:

D Spacing Intercept.....: 0.780793  
Slope of Fitted Line.....: -0.00222  
Material Stress Constant.....: 1.255E-07

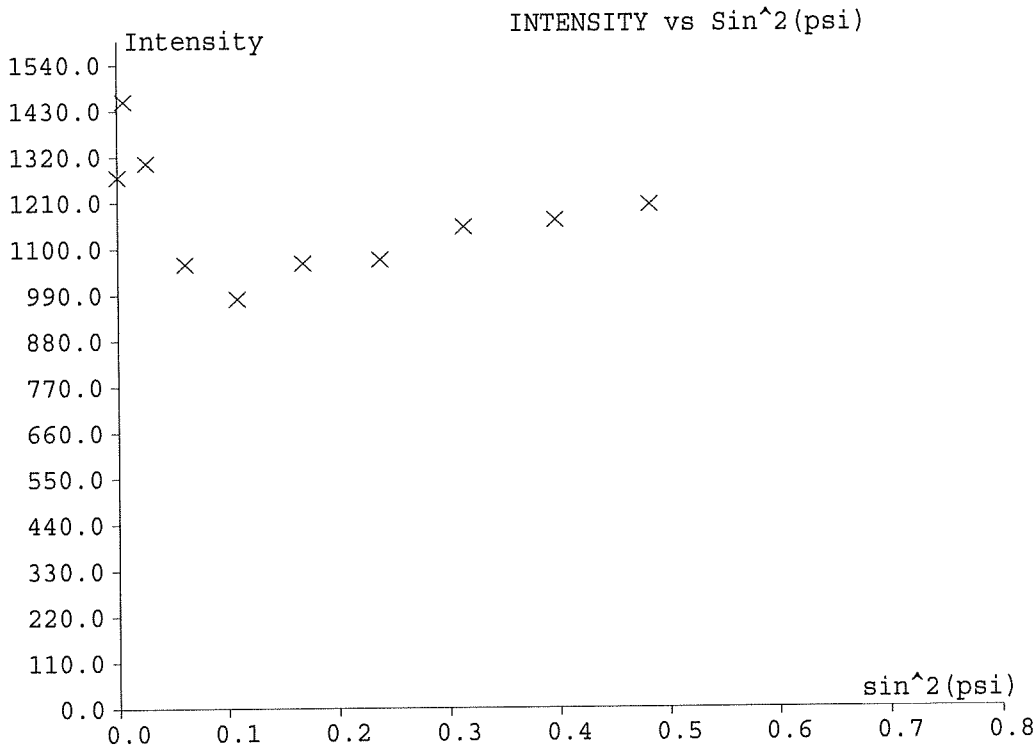
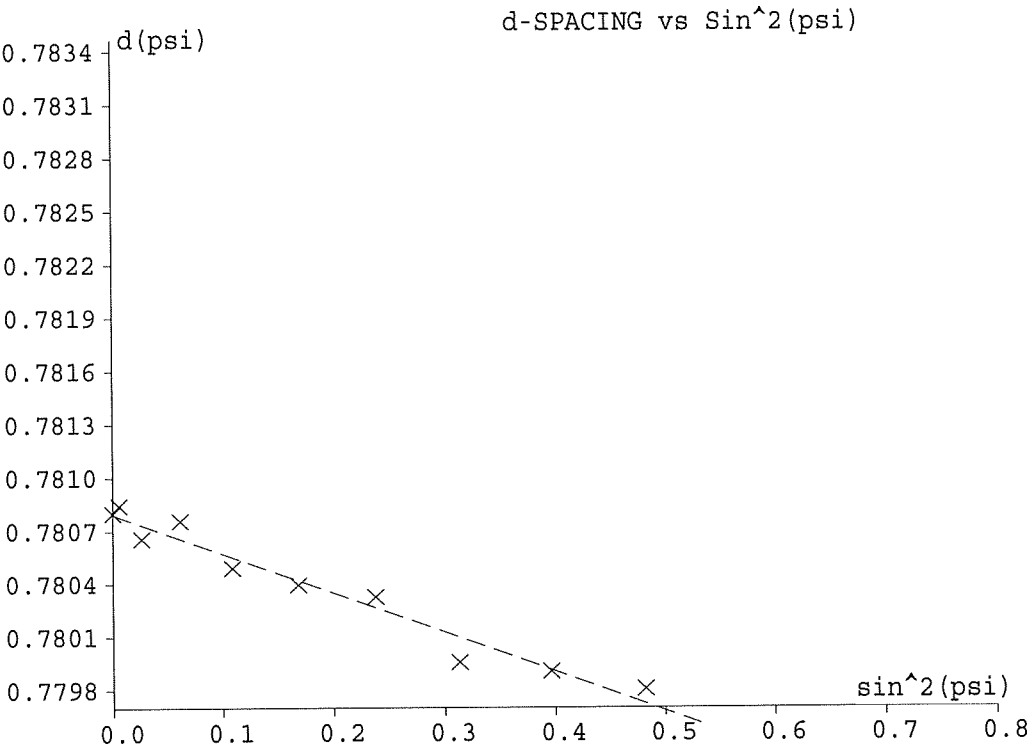
\*Residual Stress.....: -22.7 KSI -156.2 MPa

Counting Statistics Stress Error (+/-): 0.6 KSI 3.8 MPa  
Probable error.....(+/-): 1.7 KSI 11.4 MPa



File: S:\1005\2005\SBIR\50632\18455.STR  
Sample Description:  
SBIR / WP / CW Holes / AF Std. 18 / 0.10" from Edge of Hole / Hoop / ebm

\*Residual Stress.....: -22.7 KSI -156.2 MPa  
Counting Statistics Stress Error (+/-): 0.6 KSI 3.8 MPa  
Probable error.....(+/-): 1.7 KSI 11.4 MPa



===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: S:\1005\2005\SBIR\50632\18456.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 18 / 0.15" from Edge of Hole / Hoop / ebm

Acquisition date & time: 6/01/2005 3:19pm

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 30.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A -3.15219E-07 B 0.000115735 C 0.0531817 D 147.9227

Psi	Sin <sup>2</sup> (psi)	Pk Chan	Intens	FWHM	Kalp	Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00020	156.59	1435.2	3.32	0.26740		161.61	0.780307	0.000026
5.0	0.00562	153.34	1322.0	3.22	0.26362		161.40	0.780542	0.000024
10.0	0.02543	157.10	1204.3	2.98	0.26347		161.65	0.780266	0.000026
15.0	0.06037	155.69	1108.8	3.11	0.26404		161.55	0.780370	0.000027
20.0	0.10802	156.70	1172.1	2.87	0.26094		161.62	0.780292	0.000025
25.0	0.16839	155.57	1077.3	3.15	0.26456		161.55	0.780378	0.000026
30.0	0.23853	155.22	1078.5	2.77	0.25791		161.53	0.780397	0.000022
35.0	0.31336	161.30	1189.9	3.25	0.27077		161.92	0.779971	0.000047
40.0	0.39743	160.00	1282.6	2.99	0.26582		161.84	0.780058	0.000025
45.0	0.48413	159.66	1292.0	2.79	0.26172		161.82	0.780079	0.000018

Fitted Delta D vs Sin<sup>2</sup>(psi) Data:

D Spacing Intercept.....: 0.780404  
Slope of Fitted Line.....: -0.0007666  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -7.8 KSI -54.0 MPa

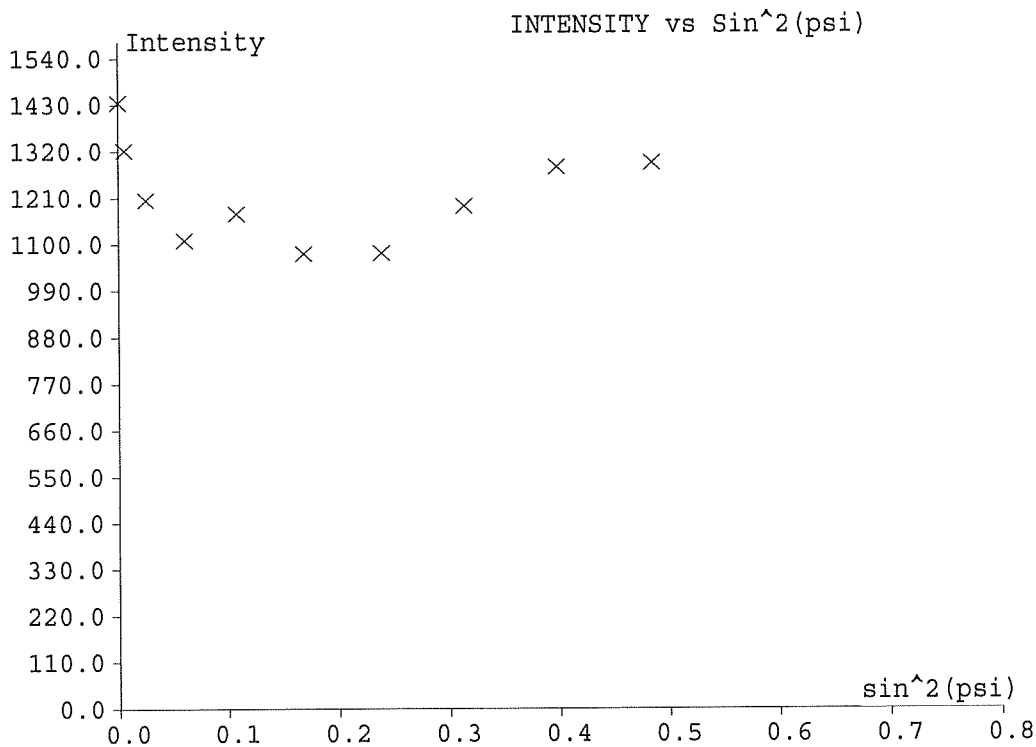
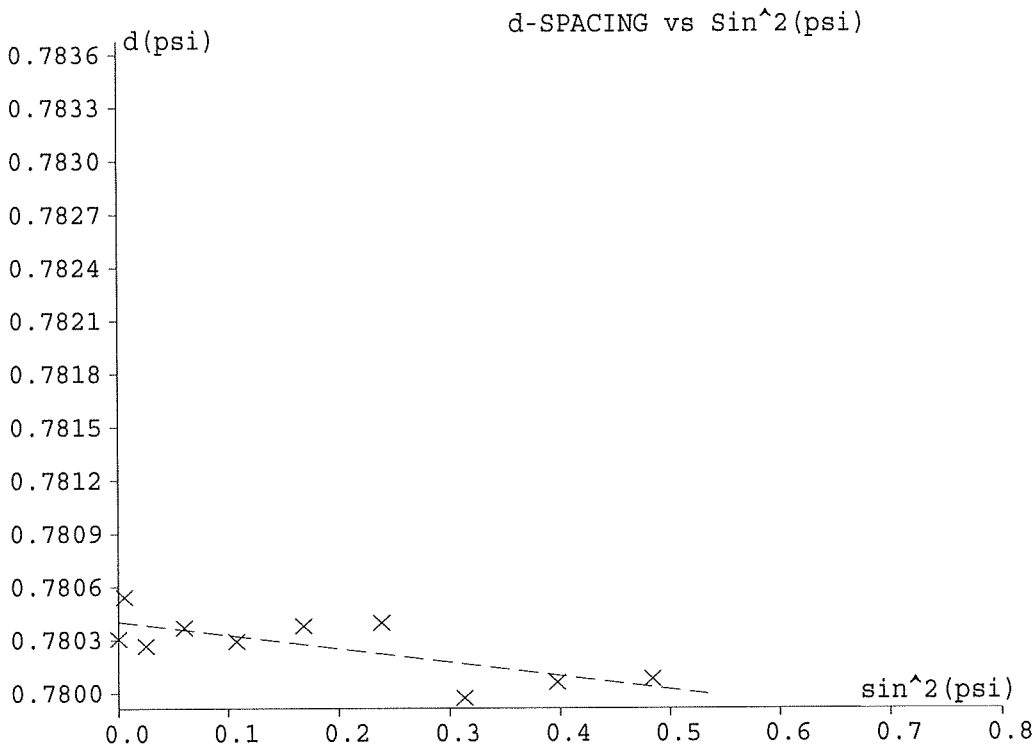
Counting Statistics Stress Error (+/-): 0.5 KSI 3.4 MPa  
Probable error.....(+/-): 2.5 KSI 17.2 MPa

File: S:\1005\2005\SBIR\50632\18456.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 18 / 0.15" from Edge of Hole / Hoop / ebm

*Residual Stress.....:	-7.8 KSI	-54.0 MPa
Counting Statistics Stress Error (+/-):	0.5 KSI	3.4 MPa
Probable error.....(+/-):	2.5 KSI	17.2 MPa



===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: S:\1005\2005\SBIR\50632\18457.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 19 / 0.05" from Edge of Hole / Hoop / ebm

Acquisition date & time: 6/01/2005 3:26pm

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 30.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A -3.15219E-07 B 0.000115735 C 0.0531817 D 147.9227

Psi	Sin <sup>2</sup> (psi)	Pk Chan	Intens	FWHM	Kalp Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00009	148.66	986.0	3.34	0.26064	161.09	0.780889	0.000035
5.0	0.00615	147.36	1068.1	3.16	0.25776	161.01	0.780985	0.000040
10.0	0.02638	151.94	928.0	3.55	0.26542	161.30	0.780648	0.000033
15.0	0.06141	151.95	983.3	3.73	0.26687	161.30	0.780649	0.000065
20.0	0.10970	152.07	1006.2	3.30	0.26327	161.31	0.780636	0.000031
25.0	0.16878	154.72	888.5	3.48	0.26733	161.49	0.780444	0.000033
30.0	0.23603	160.54	986.0	3.60	0.27361	161.87	0.780028	0.000044
35.0	0.31214	163.67	926.2	3.65	0.27707	162.07	0.779809	0.000045
40.0	0.39373	166.80	1066.5	3.52	0.27905	162.27	0.779592	0.000037
45.0	0.47870	169.43	983.1	3.46	0.28061	162.44	0.779413	0.000027

Fitted Delta D vs Sin<sup>2</sup>(psi) Data:

D Spacing Intercept.....: 0.780888  
Slope of Fitted Line.....: -0.003227  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -32.9 KSI -227.0 MPa

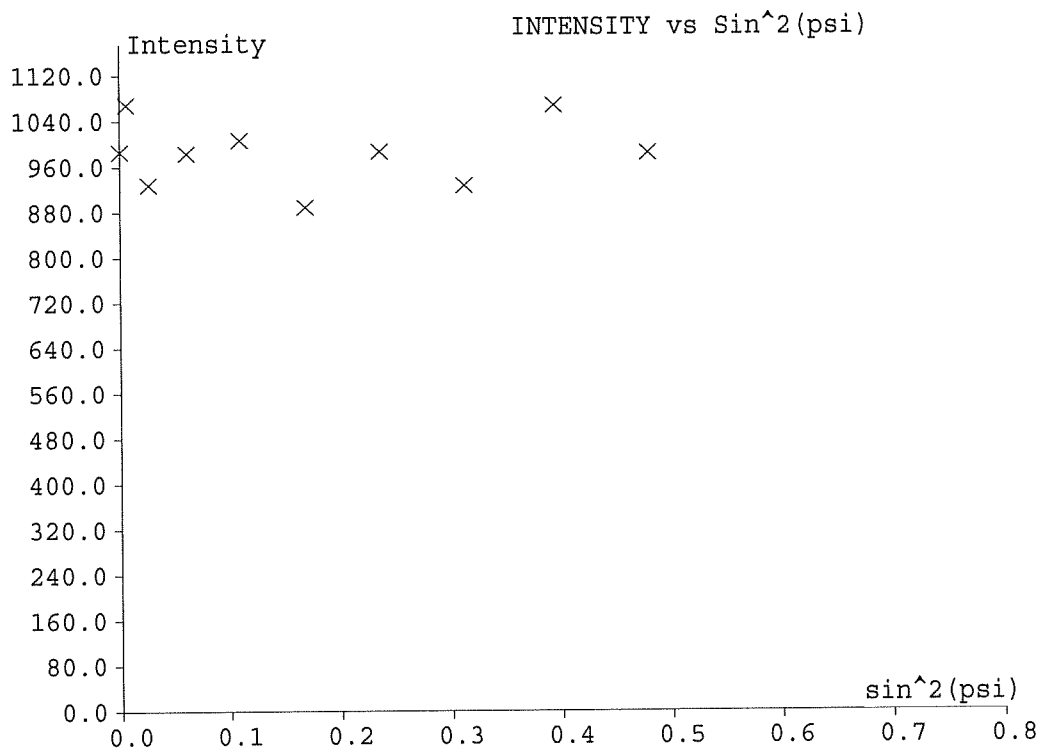
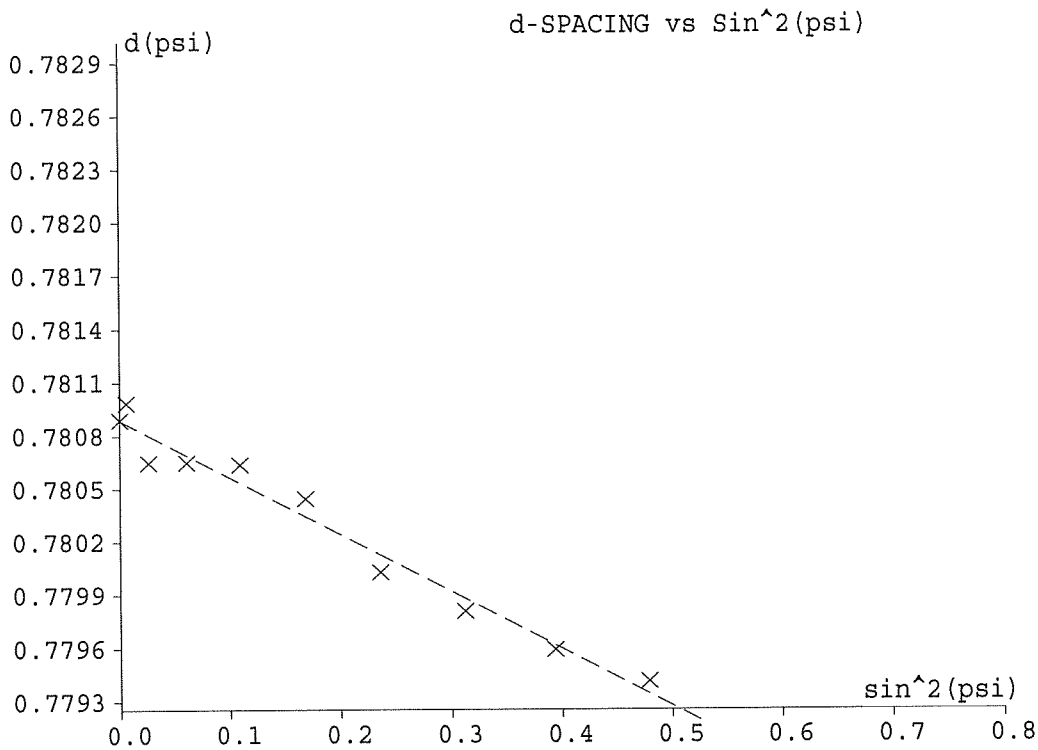
Counting Statistics Stress Error (+/-): 0.7 KSI 5.0 MPa  
Probable error.....(+/-): 2.0 KSI 13.8 MPa

File: S:\1005\2005\SBIR\50632\18457.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 19 / 0.05" from Edge of Hole / Hoop / ebm

*Residual Stress.....:	-32.9 KSI	-227.0 MPa
Counting Statistics Stress Error (+/-):	0.7 KSI	5.0 MPa
Probable error.....(+/-):	2.0 KSI	13.8 MPa



===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: S:\1005\2005\SBIR\50632\18458.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 19 / 0.10" from Edge of Hole / Hoop / ebm

Acquisition date & time: 6/01/2005 3:34pm

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 30.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A -3.15219E-07 B 0.000115735 C 0.0531817 D 147.9227

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00011	150.20	1322.0	2.99	0.25800	161.20	0.780770	0.000024
5.0	0.00570	152.47	1570.7	3.23	0.26302	161.34	0.780606	0.000021
10.0	0.02546	157.03	1325.0	3.40	0.26857	161.64	0.780276	0.000040
15.0	0.06111	153.00	1041.3	3.20	0.26309	161.38	0.780566	0.000039
20.0	0.10965	152.20	1128.9	3.13	0.26142	161.32	0.780625	0.000024
25.0	0.16923	153.56	1123.5	2.90	0.25921	161.42	0.780521	0.000022
30.0	0.23701	158.51	1180.8	3.52	0.27106	161.73	0.780172	0.000035
35.0	0.31529	157.61	1132.5	3.12	0.26585	161.68	0.780231	0.000024
40.0	0.39706	160.71	1276.2	3.16	0.26896	161.88	0.780011	0.000026
45.0	0.48223	163.14	1290.5	3.35	0.27348	162.04	0.779843	0.000033

Fitted Delta D vs Sin^2(psi) Data:

D Spacing Intercept.....: 0.780639  
Slope of Fitted Line.....: -0.001537  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -15.7 KSI -108.2 MPa

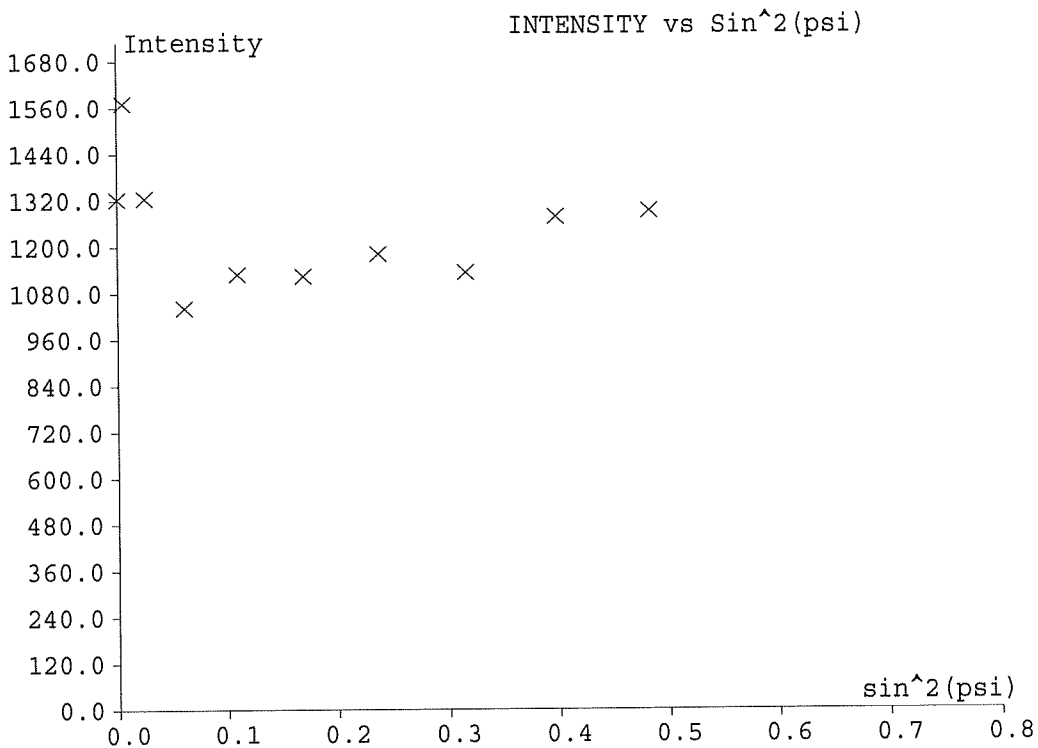
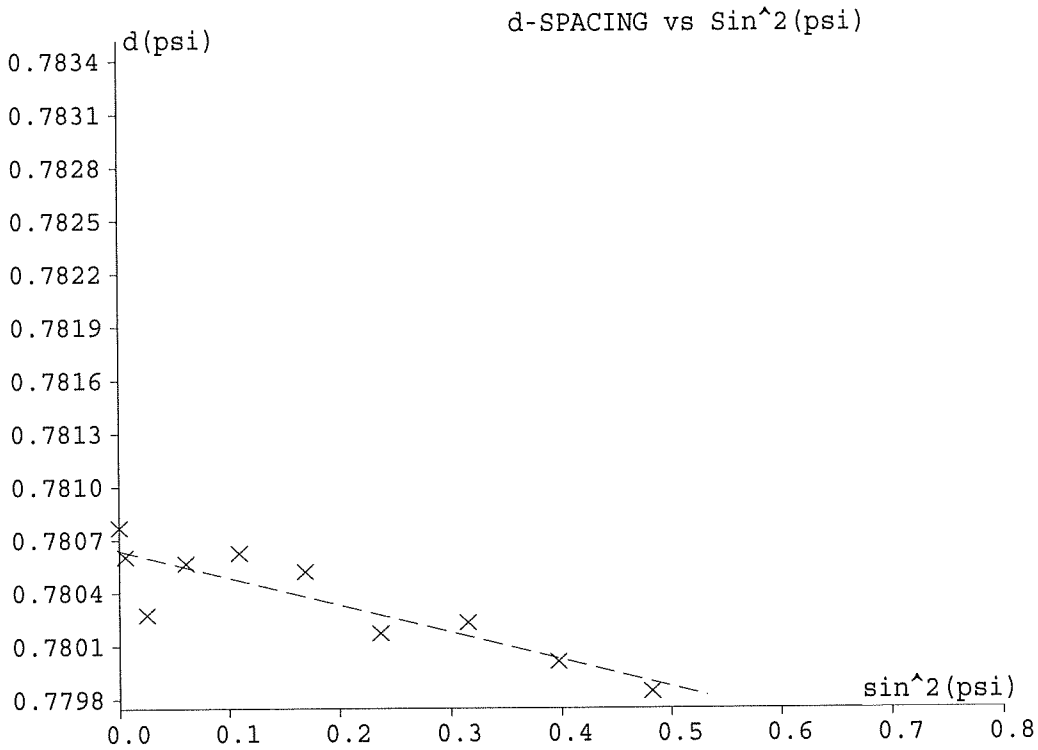
Counting Statistics Stress Error (+/-): 0.6 KSI 4.1 MPa  
Probable error.....(+/-): 3.0 KSI 20.9 MPa

File: S:\1005\2005\SBIR\50632\18458.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 19 / 0.10" from Edge of Hole / Hoop / ebm

*Residual Stress.....:	-15.7 KSI	-108.2 MPa
Counting Statistics Stress Error (+/-):	0.6 KSI	4.1 MPa
Probable error.....(+/-):	3.0 KSI	20.9 MPa



===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: S:\1005\2005\SBIR\50632\18459.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 19 / 0.15" from Edge of Hole / Hoop / ebm

Acquisition date & time: 6/01/2005 3:41pm

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 30.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A -3.15219E-07 B 0.000115735 C 0.0531817 D 147.9227

Psi	Sin <sup>2</sup> (psi)	Pk Chan	Intens	FWHM	Kalp	Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00014	152.50	1301.8	2.90	0.25839		161.35	0.780598	0.000019
5.0	0.00540	155.97	1342.1	3.11	0.26427		161.57	0.780349	0.000023
10.0	0.02590	154.54	1313.8	3.16	0.26384		161.48	0.780453	0.000026
15.0	0.06109	152.98	1167.3	2.93	0.25924		161.38	0.780564	0.000025
20.0	0.10868	154.93	1336.5	3.28	0.26556		161.50	0.780427	0.000030
25.0	0.16887	154.42	1057.9	2.99	0.26137		161.47	0.780460	0.000021
30.0	0.23702	158.42	938.0	3.11	0.26630		161.73	0.780173	0.000032
35.0	0.31682	154.69	1058.6	2.95	0.26091		161.49	0.780440	0.000020
40.0	0.39975	155.86	1275.2	3.00	0.26270		161.57	0.780356	0.000022
45.0	0.48595	156.51	1468.6	2.95	0.26237		161.61	0.780307	0.000019

Fitted Delta D vs Sin<sup>2</sup>(psi) Data:

D Spacing Intercept.....: 0.780482  
Slope of Fitted Line.....: -0.0003812  
Material Stress Constant.....: 1.255E-07

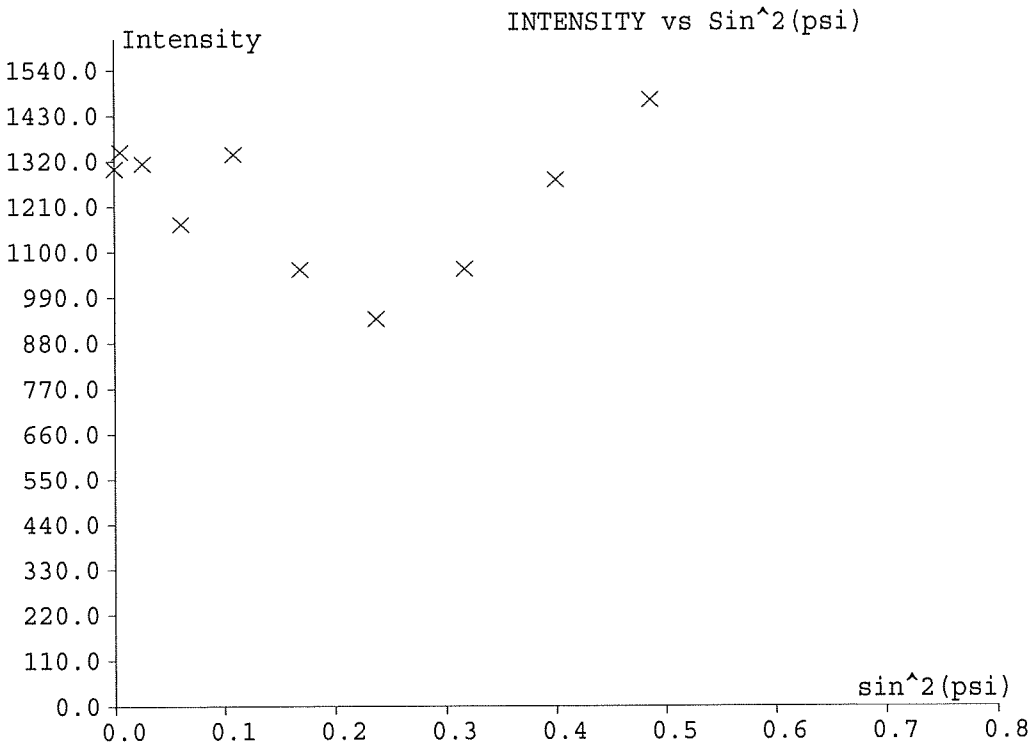
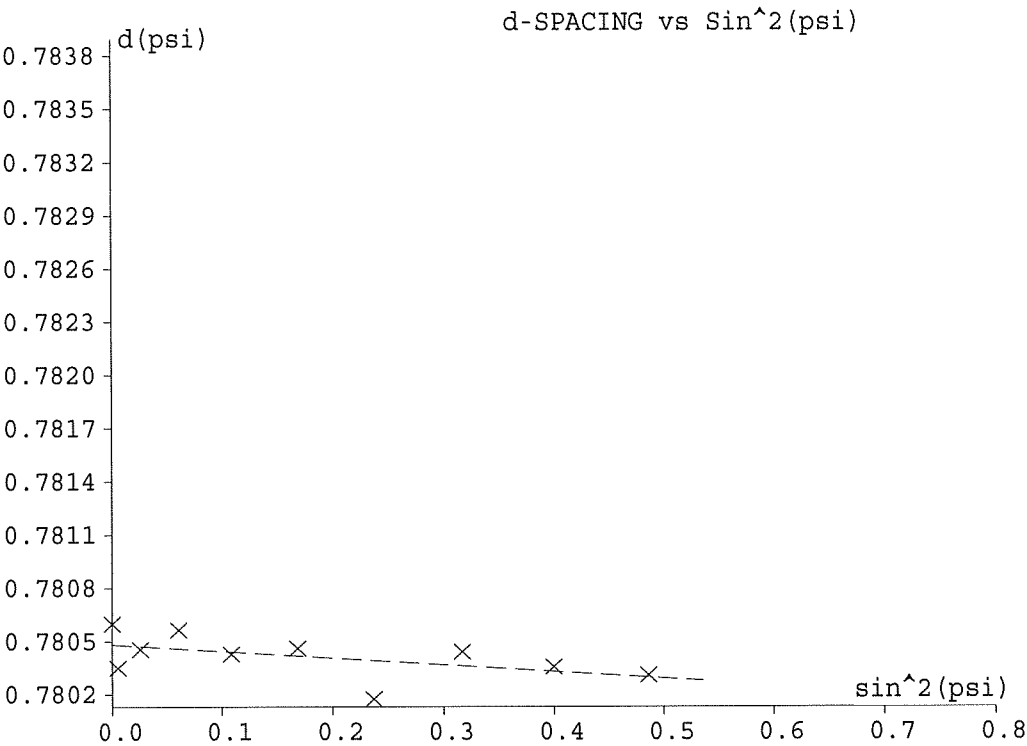
\*Residual Stress.....: -3.9 KSI -26.8 MPa

Counting Statistics Stress Error (+/-): 0.4 KSI 2.9 MPa  
Probable error.....(+/-): 2.2 KSI 15.1 MPa



File: S:\1005\2005\SBIR\50632\18459.STR  
Sample Description:  
SBIR / WP / CW Holes / AF Std. 19 / 0.15" from Edge of Hole / Hoop / ebm

\*Residual Stress.....: -3.9 KSI -26.8 MPa  
Counting Statistics Stress Error (+/-): 0.4 KSI 2.9 MPa  
Probable error.....(+/-): 2.2 KSI 15.1 MPa



===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: S:\1005\2005\SBIR\50632\18460.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 20 / 0.05" from Edge of Hole / Hoop / ebm

Acquisition date & time: 6/01/2005 3:50pm

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 30.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A -3.15219E-07 B 0.000115735 C 0.0531817 D 147.9227

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp	Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00008	147.44	990.6	3.67	0.26248		161.01	0.780984	0.000039
5.0	0.00619	146.95	1009.1	3.49	0.26046		160.98	0.781019	0.000030
10.0	0.02768	144.98	1125.5	3.40	0.25793		160.85	0.781167	0.000028
15.0	0.06091	153.77	1054.2	3.68	0.26805		161.42	0.780515	0.000037
20.0	0.10968	152.19	966.6	3.59	0.26599		161.32	0.780630	0.000039
25.0	0.16748	157.78	858.0	3.62	0.27116		161.69	0.780224	0.000056
30.0	0.23753	157.46	1059.3	3.66	0.27117		161.66	0.780248	0.000031
35.0	0.31364	160.80	980.6	3.50	0.27303		161.88	0.780009	0.000033
40.0	0.39349	167.22	1176.5	3.42	0.27814		162.30	0.779562	0.000026
45.0	0.47878	169.26	1010.3	3.37	0.27918		162.43	0.779423	0.000027

Fitted Delta D vs Sin^2(psi) Data:

D Spacing Intercept.....: 0.780990  
Slope of Fitted Line.....: -0.003406  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -34.7 KSI -239.6 MPa

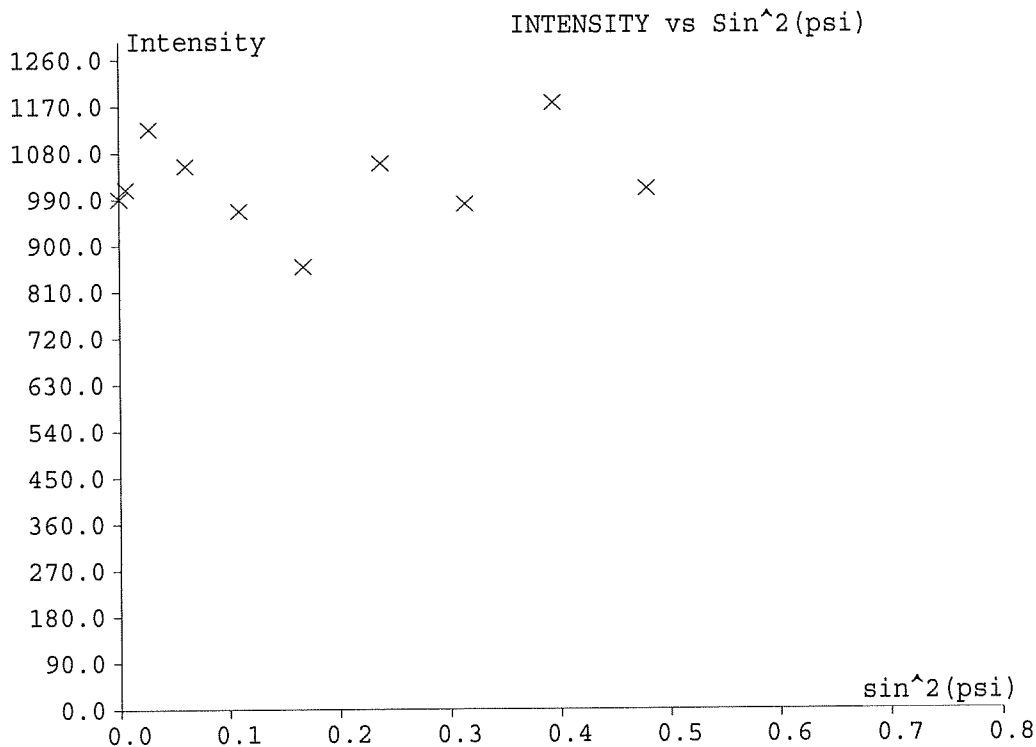
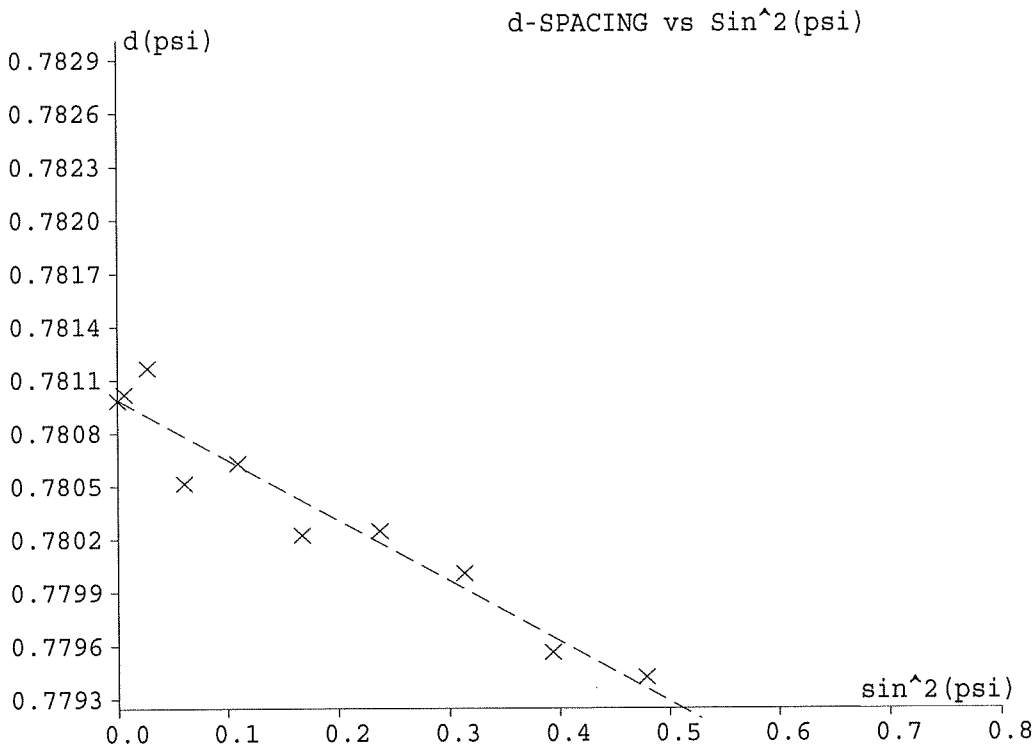
Counting Statistics Stress Error (+/-): 0.6 KSI 4.2 MPa  
Probable error.....(+/-): 3.2 KSI 22.3 MPa

File: S:\1005\2005\SBIR\50632\18460.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 20 / 0.05" from Edge of Hole / Hoop / ebm

*Residual Stress.....:	-34.7 KSI	-239.6 MPa
Counting Statistics Stress Error (+/-):	0.6 KSI	4.2 MPa
Probable error.....(+/-):	3.2 KSI	22.3 MPa



===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: S:\1005\2005\SBIR\50632\18461.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 20 / 0.10" from Edge of Hole / Hoop / ebm

Acquisition date & time: 6/01/2005 3:57pm

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 30.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A -3.15219E-07 B 0.000115735 C 0.0531817 D 147.9227

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp	Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00013	151.60	1322.4	3.52	0.26489		161.28	0.780673	0.000027
5.0	0.00585	150.73	1330.9	3.54	0.26424		161.22	0.780737	0.000030
10.0	0.02673	150.00	1441.8	3.23	0.26083		161.18	0.780788	0.000023
15.0	0.06046	155.41	1318.5	3.47	0.26785		161.53	0.780394	0.000033
20.0	0.10929	153.21	1359.5	3.18	0.26292		161.39	0.780551	0.000026
25.0	0.16829	155.81	1117.9	3.13	0.26446		161.56	0.780361	0.000032
30.0	0.23778	156.85	1093.4	3.12	0.26524		161.63	0.780286	0.000031
35.0	0.31431	159.45	1046.2	3.11	0.26722		161.80	0.780099	0.000026
40.0	0.39552	163.50	1226.0	3.31	0.27338		162.06	0.779817	0.000028
45.0	0.48050	166.18	1061.4	3.25	0.27494		162.24	0.779631	0.000028

Fitted Delta D vs Sin^2(psi) Data:

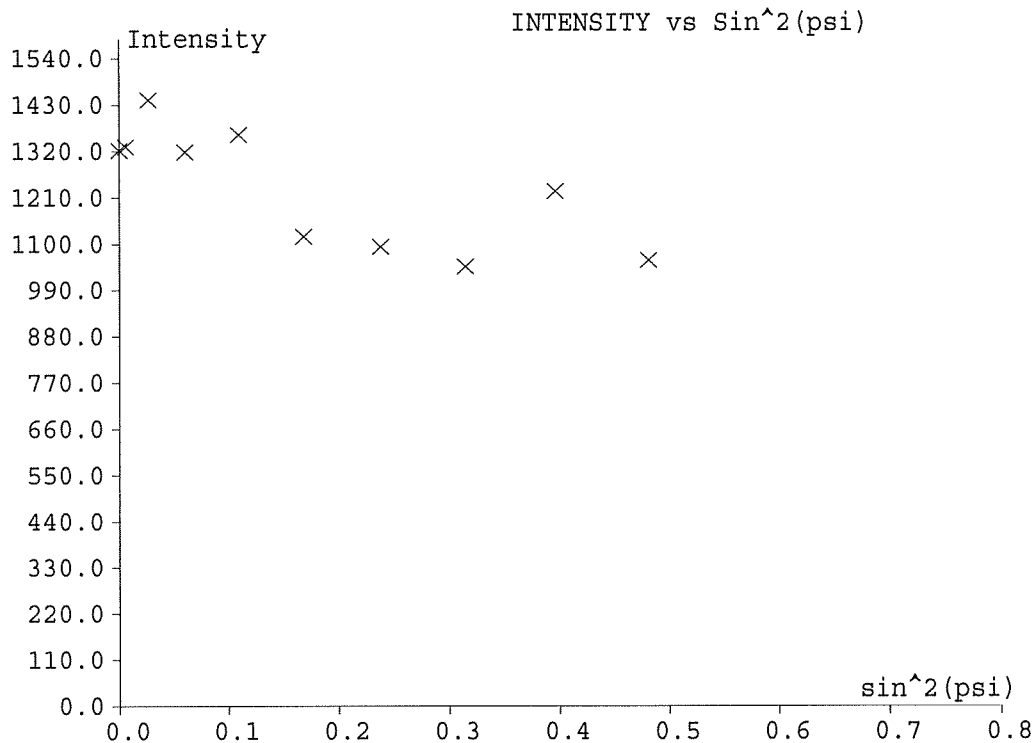
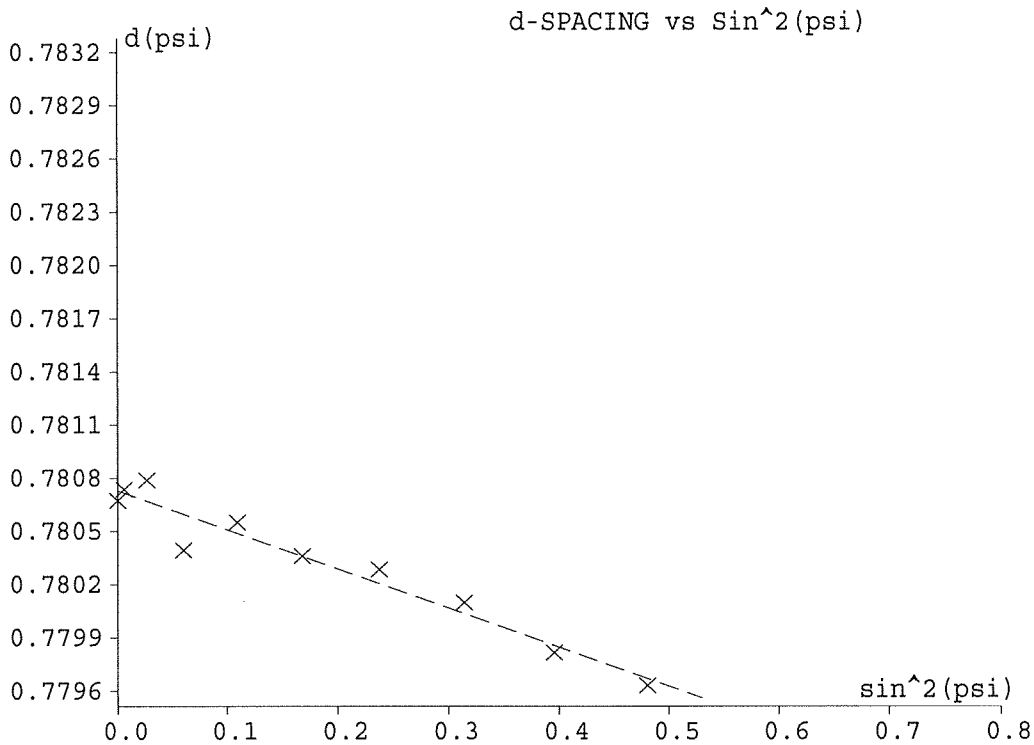
D Spacing Intercept.....: 0.780730  
Slope of Fitted Line.....: -0.002202  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -22.5 KSI -154.9 MPa

Counting Statistics Stress Error (+/-): 0.6 KSI 3.8 MPa  
Probable error.....(+/-): 1.9 KSI 13.3 MPa

File: S:\1005\2005\SBIR\50632\18461.STR  
 Sample Description:  
 SBIR / WP / CW Holes / AF Std. 20 / 0.10" from Edge of Hole / Hoop / ebm

*Residual Stress.....:	-22.5 KSI	-154.9 MPa
Counting Statistics Stress Error (+/-):	0.6 KSI	3.8 MPa
Probable error.....(+/-):	1.9 KSI	13.3 MPa



===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2005\SBIR\50632\18462.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 20 / 0.15" from Edge of Hole / Hoop / ebm

Acquisition date & time: 6/01/2005 4:07pm

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 30.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A -3.15219E-07 B 0.000115735 C 0.0531817 D 147.9227

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00020	156.86	1292.4	3.48	0.26920	161.63	0.780289	0.000035
5.0	0.00533	156.77	1470.9	3.27	0.26709	161.62	0.780293	0.000030
10.0	0.02612	153.32	1225.1	3.07	0.26153	161.40	0.780541	0.000024
15.0	0.05954	158.71	1200.1	2.96	0.26444	161.75	0.780150	0.000026
20.0	0.10752	158.17	1051.7	3.12	0.26628	161.72	0.780191	0.000024
25.0	0.16740	157.85	1106.0	2.98	0.26397	161.70	0.780212	0.000024
30.0	0.23715	158.17	1079.6	3.17	0.26708	161.72	0.780192	0.000030
35.0	0.31515	157.91	1118.6	3.24	0.26773	161.70	0.780212	0.000055
40.0	0.39920	156.81	1242.1	2.88	0.26135	161.63	0.780285	0.000018
45.0	0.48349	160.87	1143.9	3.15	0.26896	161.89	0.779999	0.000030

Fitted Delta D vs Sin^2(psi) Data:

D Spacing Intercept.....: 0.780317  
Slope of Fitted Line.....: -0.0004459  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -4.6 KSI -31.4 MPa

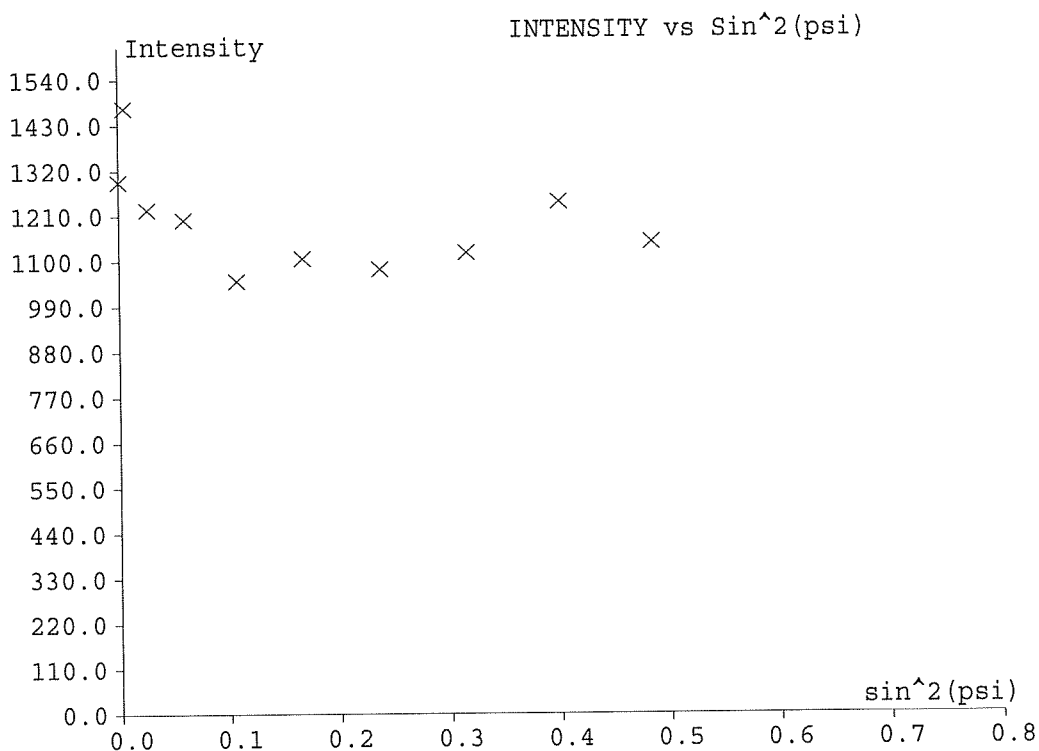
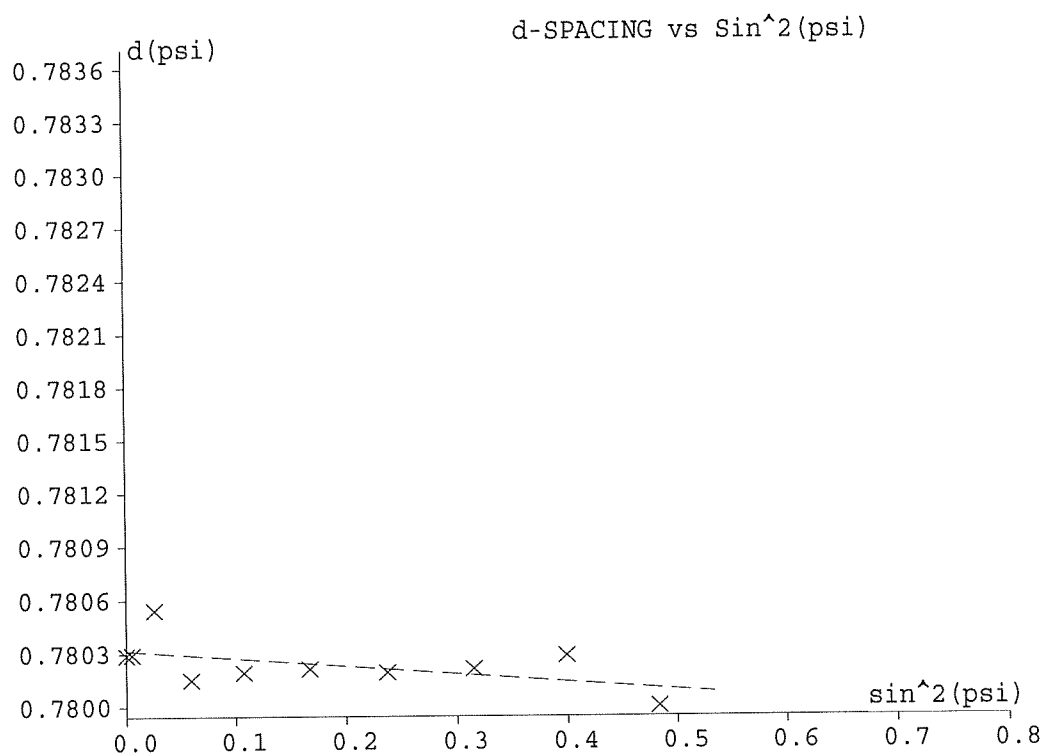
Counting Statistics Stress Error (+/-): 0.6 KSI 4.2 MPa  
Probable error.....(+/-): 2.4 KSI 16.4 MPa

File: C:\STRESS\DATA\2005\SBIR\50632\18462.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 20 / 0.15" from Edge of Hole / Hoop / ebm

*Residual Stress.....:	-4.6 KSI	-31.4 MPa
Counting Statistics Stress Error (+/-):	0.6 KSI	4.2 MPa
Probable error.....(+/-):	2.4 KSI	16.4 MPa







===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2005\SBIR\50632\19378.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 11 / 1.5" from Hole / Baseline / Transverse / ebm

Acquisition date & time: 8/22/2005 3:14pm

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 30.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A 1.42245E-08 B -5.2884E-06 C 0.0618978 D 148.0758

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00034	168.13	1002.5	3.63	0.27778	162.12	0.779751	0.000025
5.0	0.00466	168.91	873.1	3.43	0.27635	162.17	0.779698	0.000022
10.0	0.02413	168.19	908.5	3.48	0.27640	162.13	0.779745	0.000024
15.0	0.05793	168.48	920.5	3.41	0.27583	162.15	0.779725	0.000024
20.0	0.10549	167.66	784.1	3.63	0.27737	162.09	0.779781	0.000030
25.0	0.16511	166.86	755.2	3.25	0.27250	162.05	0.779828	0.000032
30.0	0.23400	168.43	734.6	3.62	0.27799	162.14	0.779731	0.000028
35.0	0.31190	167.51	1005.7	2.76	0.26413	162.10	0.779777	0.000021
40.0	0.39455	168.95	892.6	3.43	0.27639	162.17	0.779695	0.000027
45.0	0.48066	169.68	724.2	3.59	0.27884	162.22	0.779650	0.000031

Fitted Delta D vs Sin^2(psi) Data:

D Spacing Intercept.....: 0.779758  
Slope of Fitted Line.....: -0.0001136  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -1.2 KSI -8.0 MPa

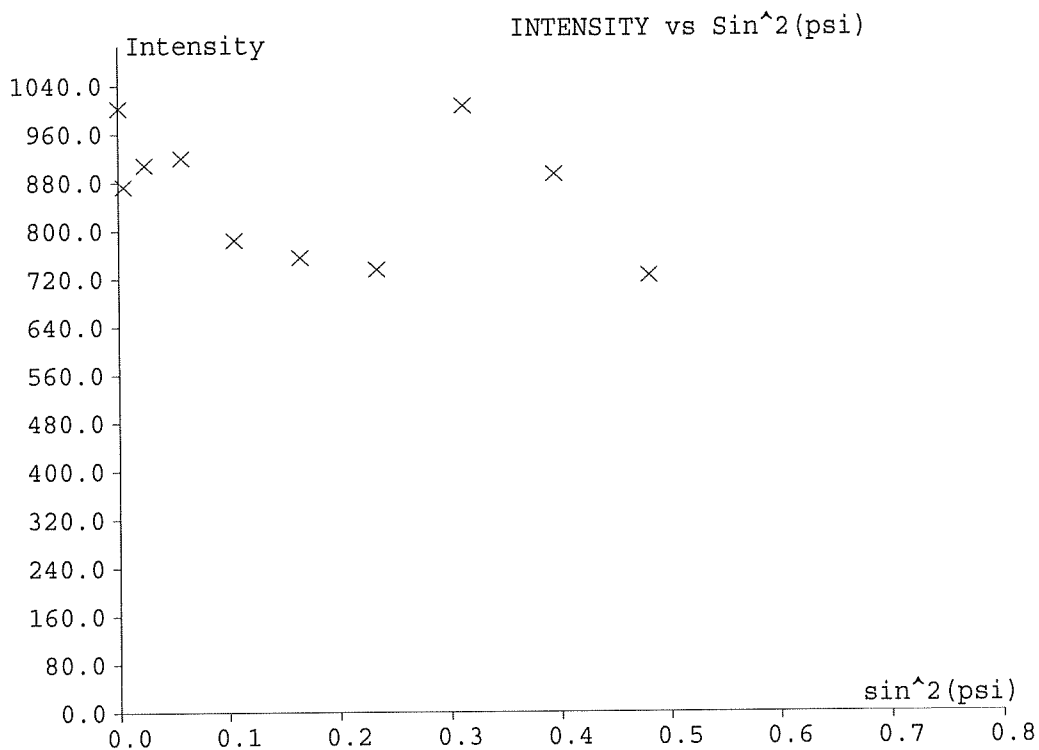
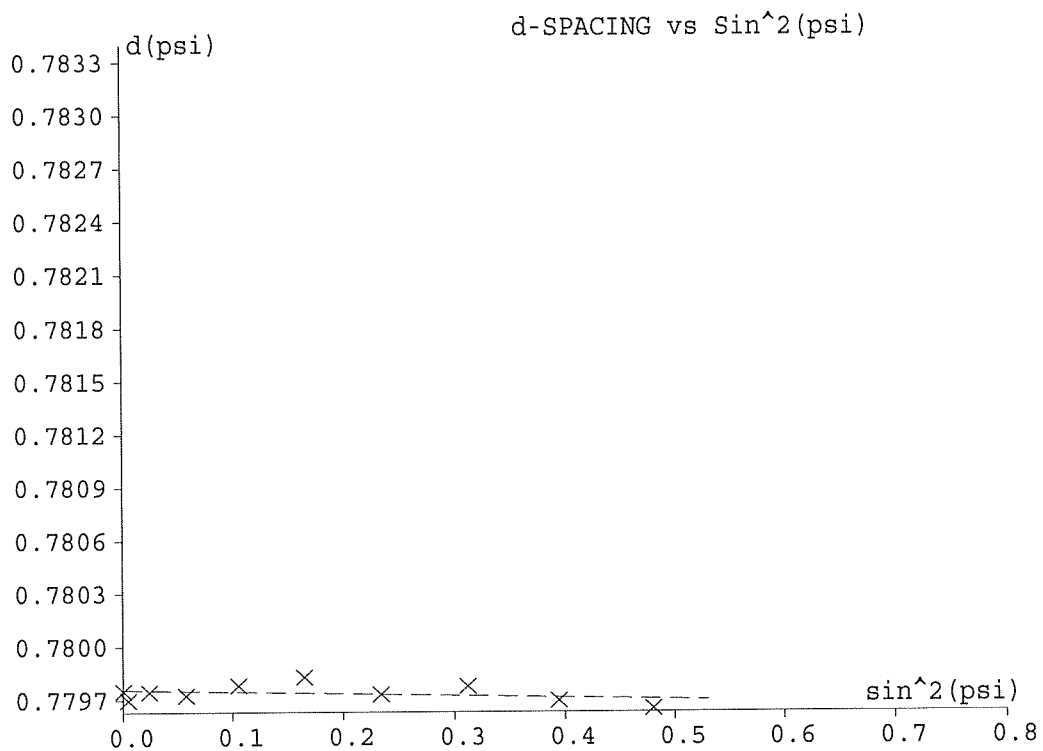
Counting Statistics Stress Error (+/-): 0.5 KSI 3.7 MPa  
Probable error.....(+/-): 1.0 KSI 6.8 MPa  
Warning: Counting statistics may be the controlling error!

File: C:\STRESS\DATA\2005\SBIR\50632\19378.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 11 / 1.5" from Hole / Baseline / Transverse / ebm

*Residual Stress.....	-1.2 KSI	-8.0 MPa
Counting Statistics Stress Error (+/-):	0.5 KSI	3.7 MPa
Probable error.....(+/-):	1.0 KSI	6.8 MPa



===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2005\SBIR\50632\19368.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 1 / 1.5" from Hole / Baseline / Transverse / ebm

Acquisition date & time: 8/22/2005 1:13pm

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 30.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A 1.42245E-08 B -5.2884E-06 C 0.0618978 D 148.0758

Psi	Sin <sup>2</sup> (psi)	Pk Chan	Intens	FWHM	Kalp Cor	A	2-Theta	D Spacing	St. Dev.
0.0	0.00020	159.81	935.4	3.61	0.27017		161.62	0.780296	0.000025
5.0	0.00518	161.87	935.2	3.77	0.27302		161.74	0.780161	0.000031
10.0	0.02530	161.04	1093.5	3.49	0.27025		161.70	0.780214	0.000029
15.0	0.05978	161.04	934.6	3.40	0.26931		161.70	0.780213	0.000028
20.0	0.10700	163.00	1092.0	3.51	0.27214		161.81	0.780084	0.000027
25.0	0.16704	161.96	908.6	3.40	0.27014		161.75	0.780151	0.000034
30.0	0.23719	161.29	718.3	3.54	0.27086		161.71	0.780197	0.000032
35.0	0.31305	165.36	890.7	3.55	0.27463		161.96	0.779930	0.000029
40.0	0.39780	162.63	787.5	3.31	0.26978		161.79	0.780106	0.000021
45.0	0.48519	161.06	824.7	3.39	0.26923		161.70	0.780211	0.000031

Fitted Delta D vs Sin<sup>2</sup>(psi) Data:

D Spacing Intercept.....: 0.780195  
Slope of Fitted Line.....: -0.000217  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -2.2 KSI -15.3 MPa

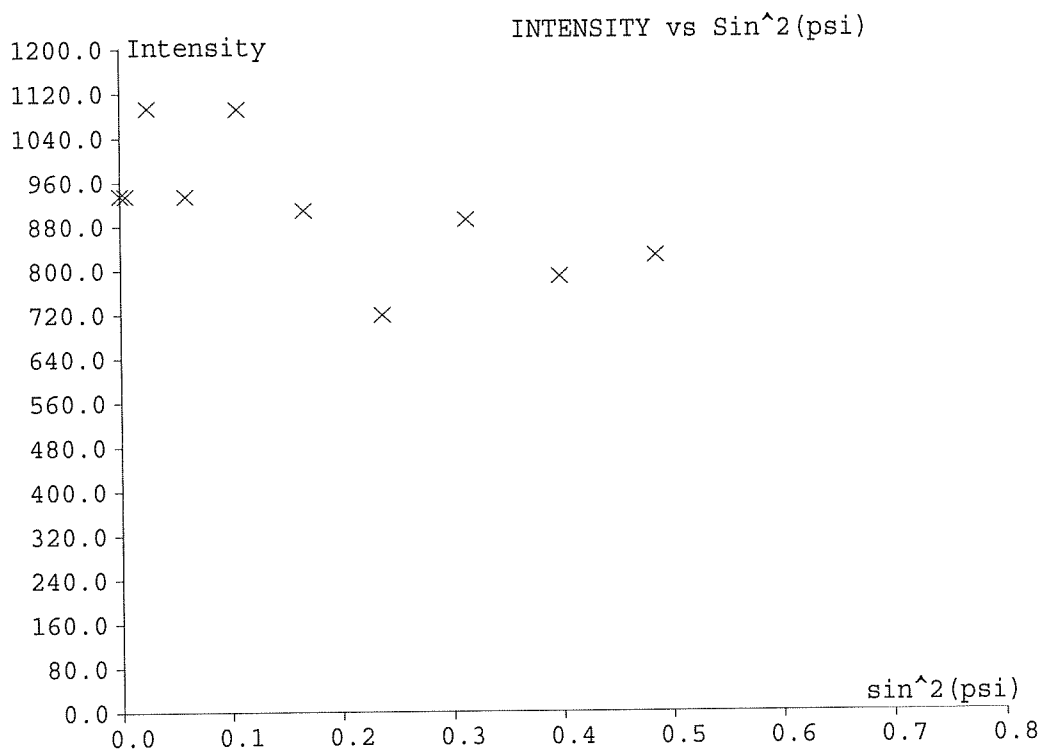
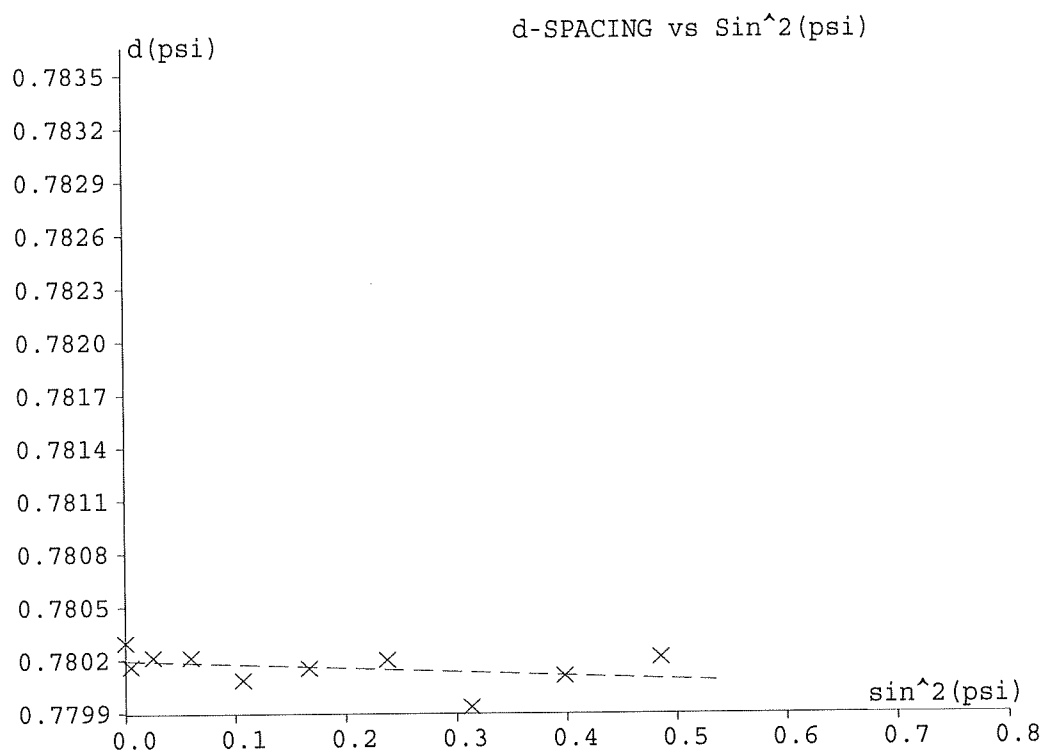
Counting Statistics Stress Error (+/-): 0.6 KSI 3.8 MPa  
Probable error.....(+/-): 1.9 KSI 13.3 MPa

File: C:\STRESS\DATA\2005\SBIR\50632\19368.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 1 / 1.5" from Hole / Baseline / Transverse / ebm

*Residual Stress.....:	-2.2 KSI	-15.3 MPa
Counting Statistics Stress Error (+/-):	0.6 KSI	3.8 MPa
Probable error.....(+/-):	1.9 KSI	13.3 MPa



===== TEC Stress Analyzer v1.64 =====  
 ===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2005\SBIR\50632\19369.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 2 / 1.5" from Hole / Baseline / Transverse / ebm

Acquisition date & time: 8/22/2005 1:24pm

Material [hkl].....: Al 5083-H23 [333]  
 Depth.....: 0.0000000  
 Phi angle.....: 0.00  
 Collimator.....: Round\_4mm  
 Bracket.....: 160s  
 Peak Bounding Range [percent].....: 20  
 X-ray Target Description and Wavelength: copper 1.54056  
 PSI Oscillation Angle Range.....: 2.00  
 Spectra count time (PSI=0).....: 30.0  
 High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
 ADC Channels Full Scale.....: 256  
 Detector Calibration Coefficients:  
 A 1.42245E-08 B -5.2884E-06 C 0.0618978 D 148.0758

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp	Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00031	166.18	945.9	3.59	0.27570		162.01	0.779877	0.000025
5.0	0.00505	163.69	972.8	3.75	0.27461		161.85	0.780041	0.000035
10.0	0.02457	165.47	834.5	3.50	0.27427		161.96	0.779922	0.000028
15.0	0.05902	164.03	1014.9	3.22	0.26986		161.88	0.780013	0.000026
20.0	0.10538	168.00	904.0	3.78	0.27880		162.11	0.779760	0.000029
25.0	0.16569	165.42	757.7	3.44	0.27351		161.96	0.779925	0.000030
30.0	0.23477	166.70	757.4	3.71	0.27705		162.04	0.779844	0.000029
35.0	0.31184	167.83	925.5	3.46	0.27583		162.11	0.779768	0.000025
40.0	0.39686	164.40	986.1	3.03	0.26723		161.90	0.779985	0.000019
45.0	0.48253	166.11	763.4	3.51	0.27491		162.00	0.779881	0.000024

Fitted Delta D vs Sin^2(psi) Data:

D Spacing Intercept.....: 0.779925  
 Slope of Fitted Line.....: -0.0001323  
 Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -1.4 KSI -9.3 MPa

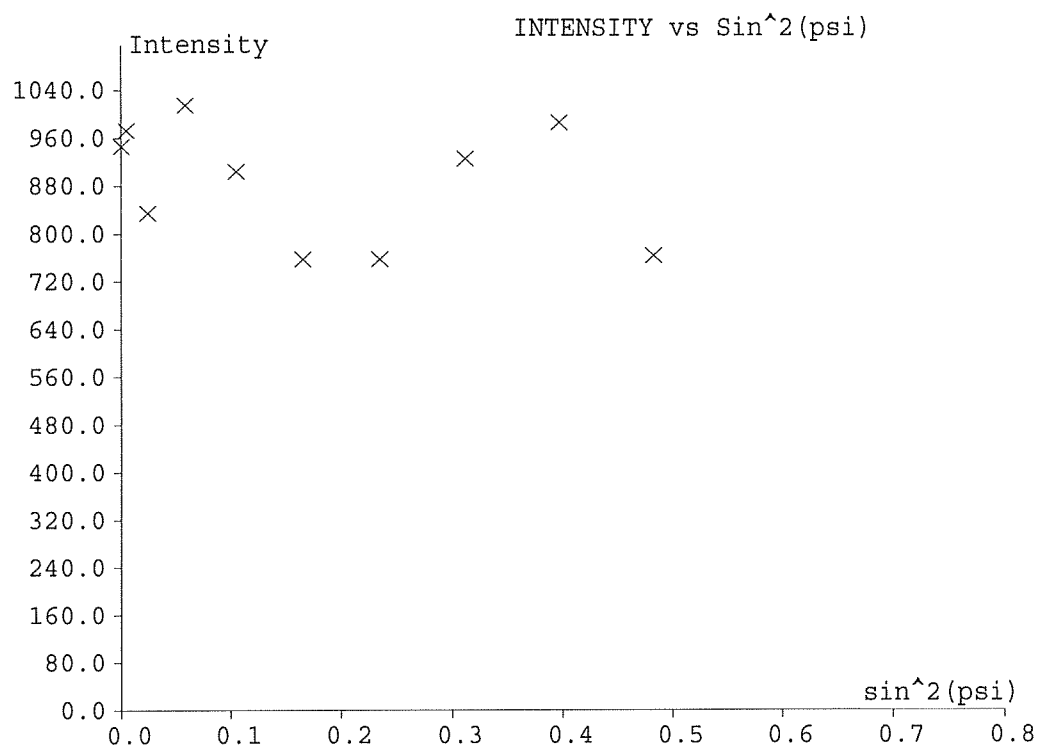
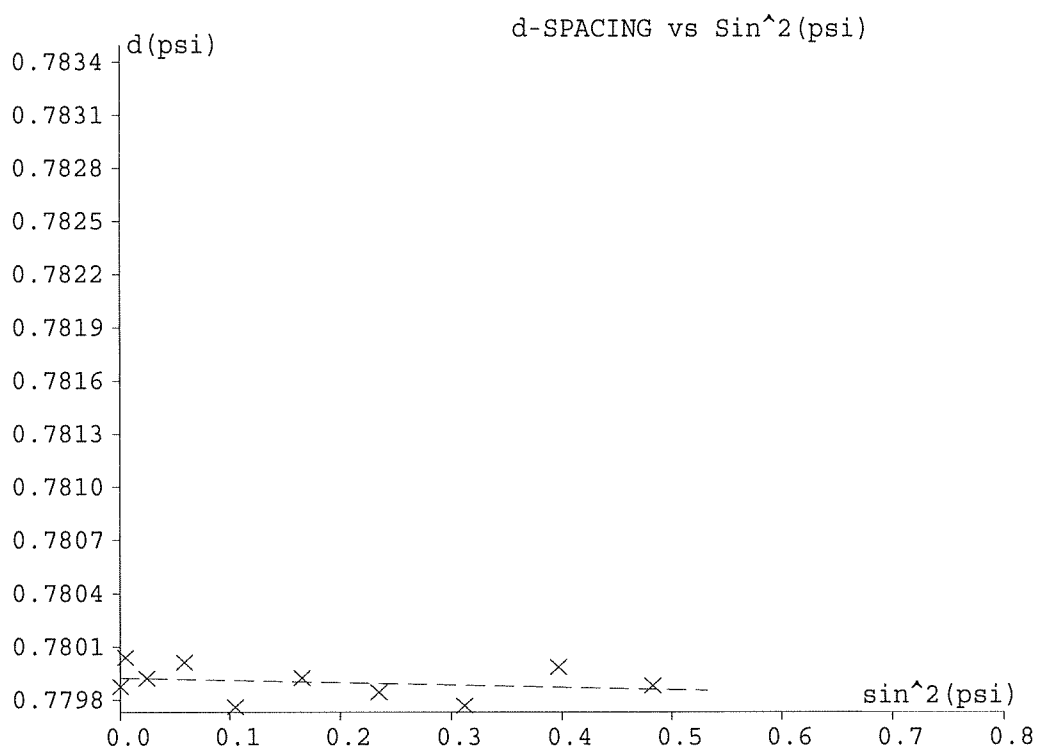
Counting Statistics Stress Error (+/-): 0.5 KSI 3.5 MPa  
 Probable error.....(+/-): 1.9 KSI 13.4 MPa

File: C:\STRESS\DATA\2005\SBIR\50632\19369.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 2 / 1.5" from Hole / Baseline / Transverse / ebm

*Residual Stress.....	-1.4 KSI	-9.3 MPa
Counting Statistics Stress Error (+/-):	0.5 KSI	3.5 MPa
Probable error.....(+/-):	1.9 KSI	13.4 MPa



===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2005\SBIR\50632\19370.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 3 / 1.5" from Hole / Baseline / Transverse / ebm

Acquisition date & time: 8/22/2005 1:36pm

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 30.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A 1.42245E-08 B -5.2884E-06 C 0.0618978 D 148.0758

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00023	161.75	860.2	3.98	0.27410	161.74	0.780170	0.000039
5.0	0.00528	160.57	945.4	3.78	0.27202	161.67	0.780247	0.000030
10.0	0.02522	161.54	900.2	3.65	0.27186	161.72	0.780182	0.000035
15.0	0.05992	160.49	834.0	3.56	0.27036	161.66	0.780251	0.000037
20.0	0.10672	163.87	951.3	3.70	0.27438	161.86	0.780029	0.000041
25.0	0.16725	161.44	804.5	3.47	0.27037	161.72	0.780187	0.000029
30.0	0.23721	161.24	795.7	3.58	0.27112	161.71	0.780201	0.000031
35.0	0.31459	162.24	872.2	3.73	0.27311	161.77	0.780136	0.000029
40.0	0.39804	162.20	934.9	3.47	0.27103	161.77	0.780136	0.000028
45.0	0.48527	160.87	1000.1	3.22	0.26736	161.69	0.780222	0.000024

Fitted Delta D vs Sin^2(psi) Data:

D Spacing Intercept.....: 0.780182  
Slope of Fitted Line.....: -3.418E-05  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -0.3 KSI -2.4 MPa

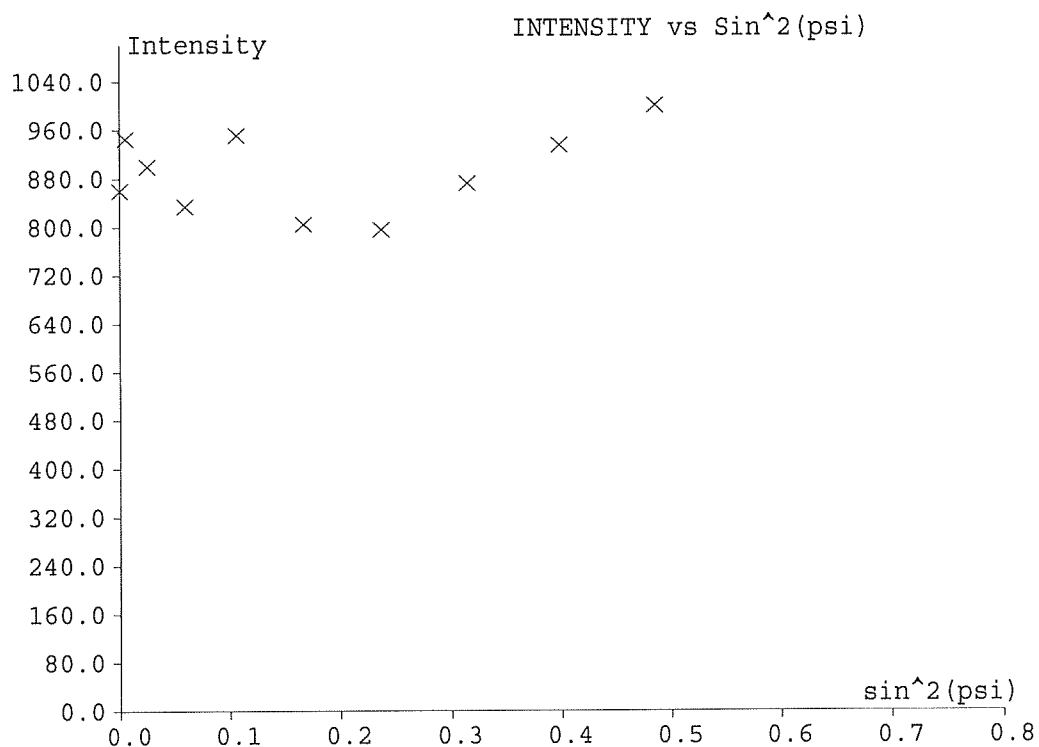
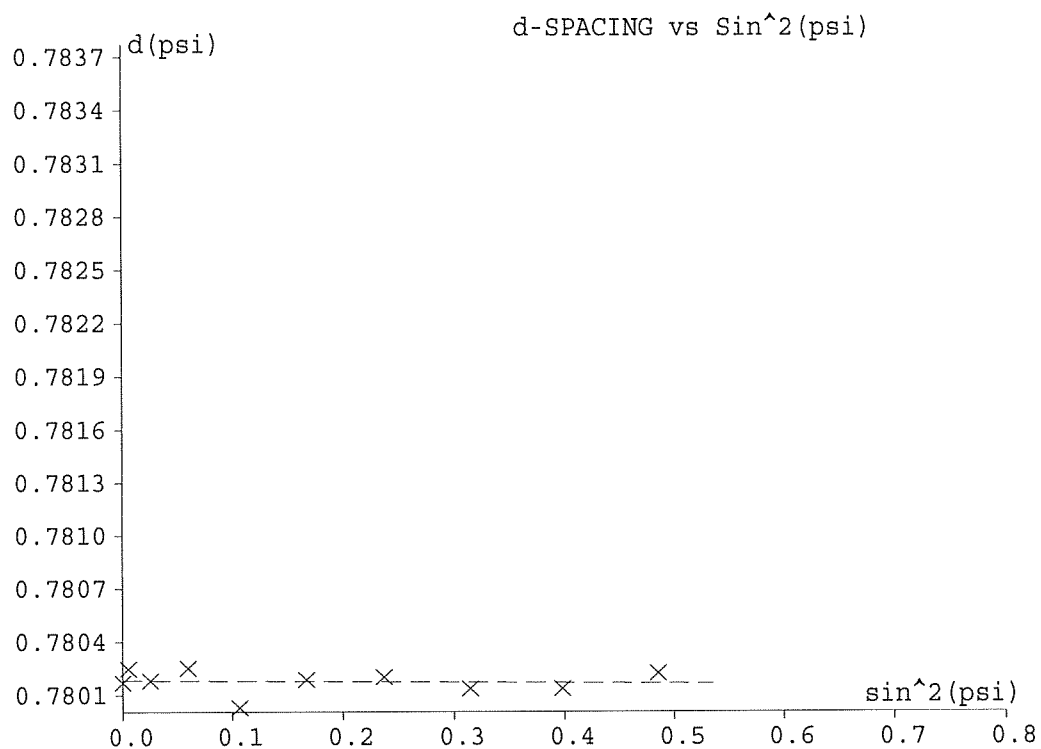
Counting Statistics Stress Error (+/-): 0.6 KSI 4.1 MPa  
Probable error.....(+/-): 1.4 KSI 9.4 MPa

File: C:\STRESS\DATA\2005\SBIR\50632\19370.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 3 / 1.5" from Hole / Baseline / Transverse / ebm

*Residual Stress.....:	-0.3 KSI	-2.4 MPa
Counting Statistics Stress Error (+/-):	0.6 KSI	4.1 MPa
Probable error.....(+/-):	1.4 KSI	9.4 MPa





===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2005\SBIR\50632\19371.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 4 / 1.5" from Hole / Baseline / Transverse / ebm

Acquisition date & time: 8/22/2005 1:58pm

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 30.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A 1.42245E-08 B -5.2884E-06 C 0.0618978 D 148.0758

Psi	Sin <sup>2</sup> (psi)	Pk Chan	Intens	FWHM	Kalp Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00023	161.84	1061.2	3.60	0.27178	161.74	0.780161	0.000033
5.0	0.00524	161.06	1072.3	3.30	0.26836	161.70	0.780210	0.000027
10.0	0.02553	159.64	993.4	3.62	0.27016	161.61	0.780308	0.000023
15.0	0.05945	162.36	882.4	3.69	0.27295	161.77	0.780128	0.000032
20.0	0.10712	162.62	983.0	3.63	0.27273	161.79	0.780110	0.000035
25.0	0.16694	162.21	922.2	3.38	0.27012	161.77	0.780135	0.000033
30.0	0.23740	160.78	837.3	3.32	0.26837	161.68	0.780229	0.000031
35.0	0.31444	162.55	929.9	3.76	0.27357	161.79	0.780116	0.000028
40.0	0.39815	161.98	963.9	3.38	0.26994	161.75	0.780150	0.000029
45.0	0.48483	161.69	782.6	3.15	0.26709	161.74	0.780166	0.000024

Fitted Delta D vs Sin<sup>2</sup>(psi) Data:

D Spacing Intercept.....: 0.780189  
Slope of Fitted Line.....: -9.78E-05  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -1.0 KSI -6.9 MPa

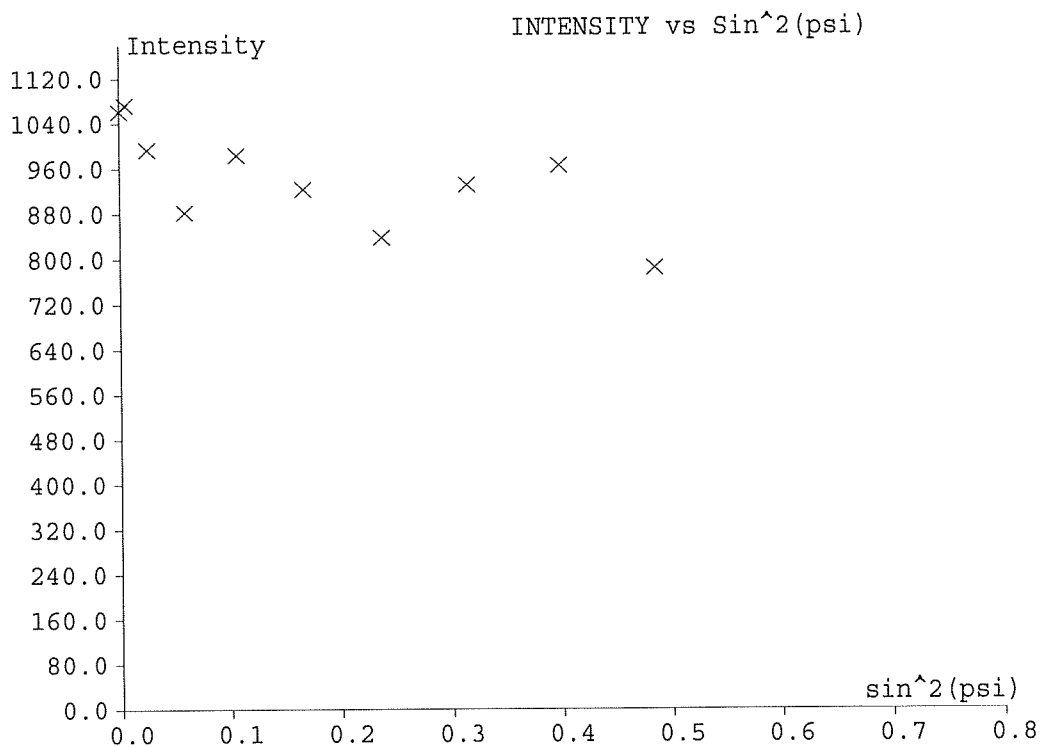
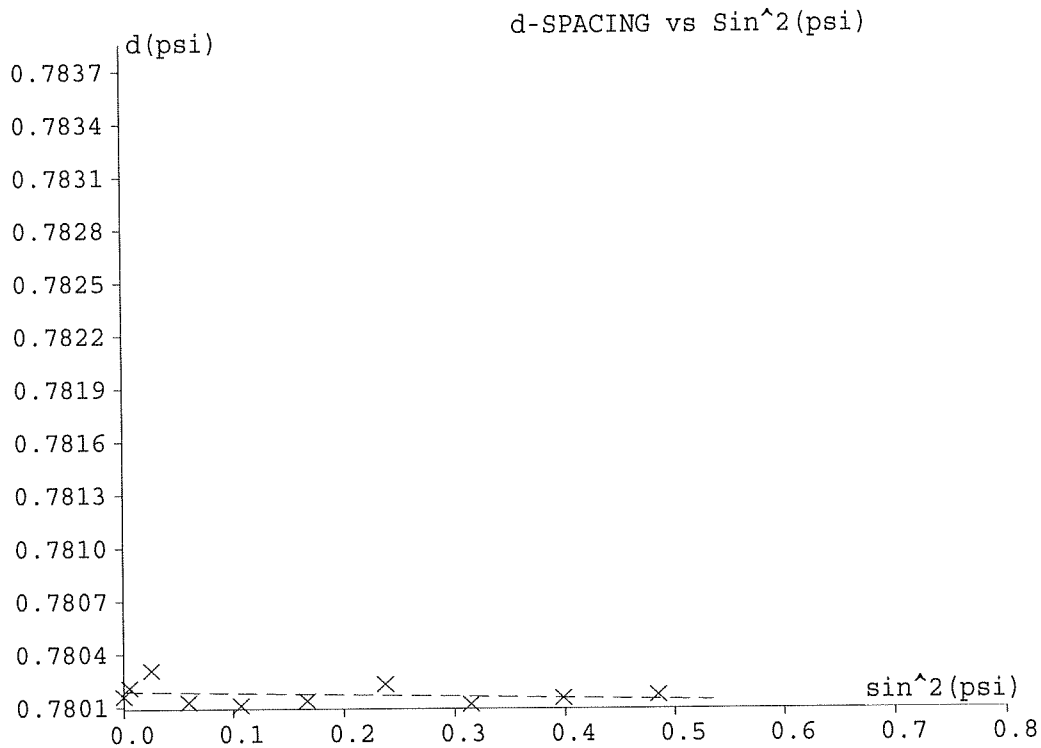
Counting Statistics Stress Error (+/-): 0.5 KSI 3.7 MPa  
Probable error.....(+/-): 1.2 KSI 8.5 MPa

File: C:\STRESS\DATA\2005\SBIR\50632\19371.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 4 / 1.5" from Hole / Baseline / Transverse / ebm

*Residual Stress.....:	-1.0 KSI	-6.9 MPa
Counting Statistics Stress Error (+/-):	0.5 KSI	3.7 MPa
Probable error.....(+/-):	1.2 KSI	8.5 MPa



===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2005\SBIR\50632\19372.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 5 / 1.5" from Hole / Baseline / Transverse / ebm

Acquisition date & time: 8/22/2005 2:06pm

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 30.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A 1.42245E-08 B -5.2884E-06 C 0.0618978 D 148.0758

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00028	164.73	941.4	3.84	0.27625	161.92	0.779973	0.000035
5.0	0.00484	166.43	1061.6	3.53	0.27545	162.02	0.779860	0.000031
10.0	0.02461	165.26	934.2	3.57	0.27469	161.95	0.779936	0.000030
15.0	0.05866	165.57	867.2	3.72	0.27612	161.97	0.779918	0.000029
20.0	0.10559	167.38	804.0	3.88	0.27896	162.08	0.779801	0.000034
25.0	0.16545	166.07	805.6	3.88	0.27771	162.00	0.779886	0.000070
30.0	0.23511	165.94	921.9	3.70	0.27631	161.99	0.779893	0.000026
35.0	0.31291	165.66	845.6	3.69	0.27596	161.97	0.779912	0.000025
40.0	0.39670	164.73	941.7	3.13	0.26907	161.92	0.779966	0.000019
45.0	0.48177	167.58	1063.3	3.68	0.27763	162.09	0.779786	0.000020

Fitted Delta D vs Sin^2(psi) Data:

D Spacing Intercept.....: 0.779910  
Slope of Fitted Line.....: -9.551E-05  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -1.0 KSI -6.7 MPa

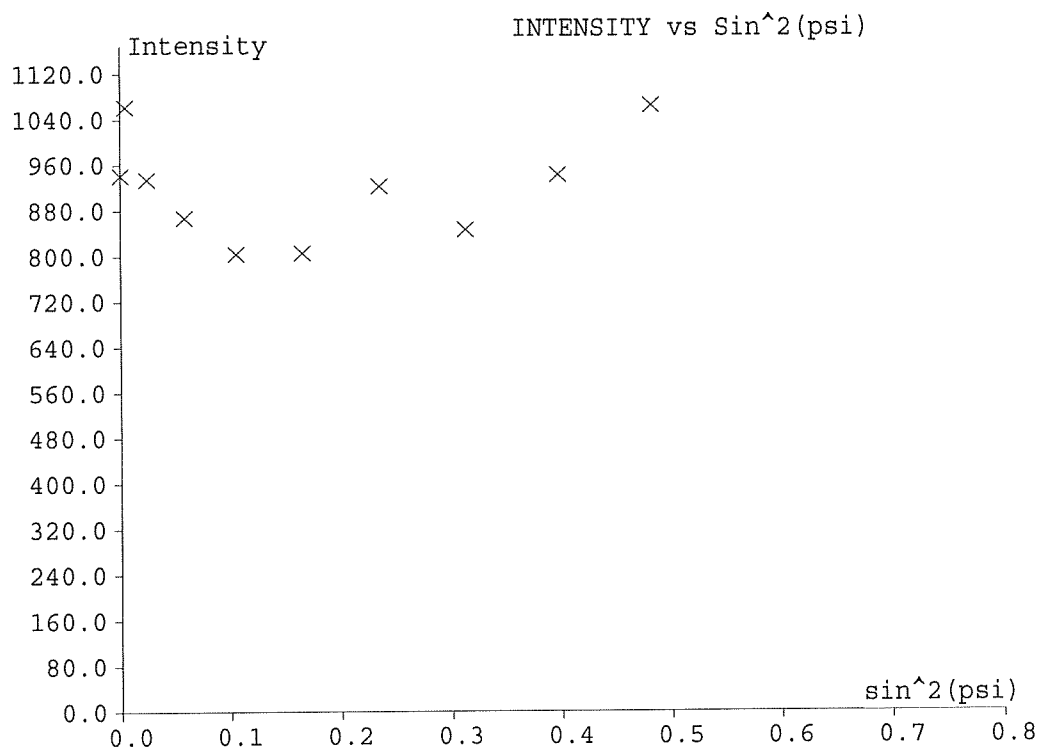
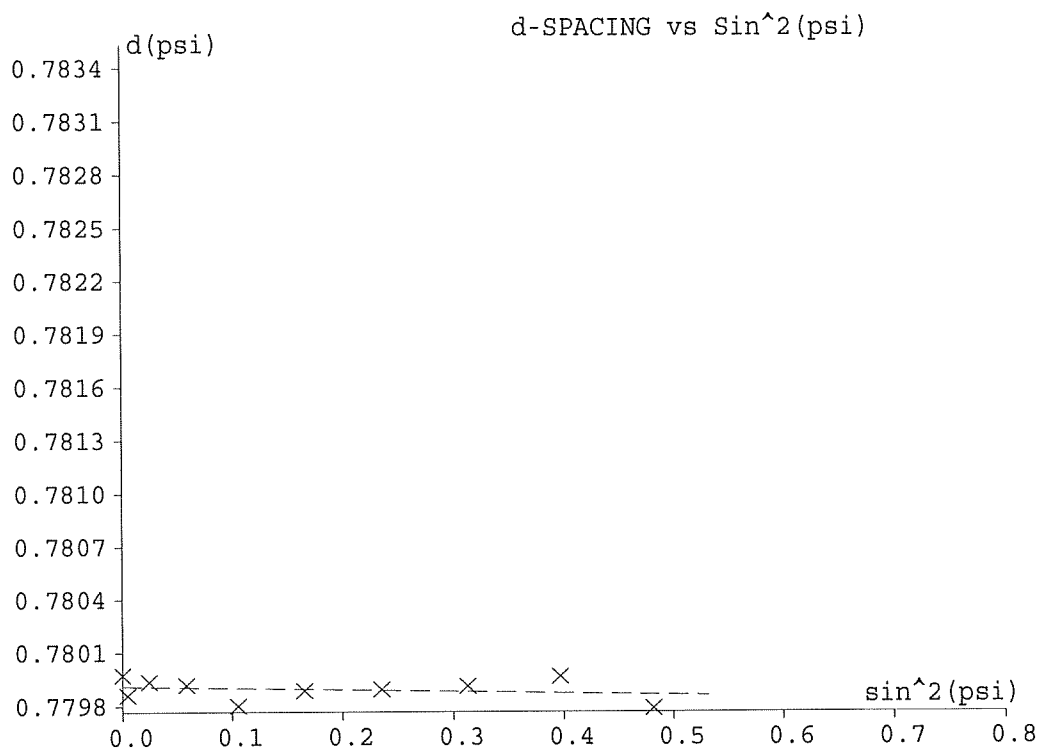
Counting Statistics Stress Error (+/-): 0.5 KSI 3.5 MPa  
Probable error..... (+/-): 1.3 KSI 8.8 MPa

File: C:\STRESS\DATA\2005\SBIR\50632\19372.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 5 / 1.5" from Hole / Baseline / Transverse / ebm

*Residual Stress.....:	-1.0 KSI	-6.7 MPa
Counting Statistics Stress Error (+/-):	0.5 KSI	3.5 MPa
Probable error.....(+/-):	1.3 KSI	8.8 MPa



===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2005\SBIR\50632\19373.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 6 / 1.5" from Hole / Baseline / Transverse / ebm

Acquisition date & time: 8/22/2005 2:21pm

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 30.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A 1.42245E-08 B -5.2884E-06 C 0.0618978 D 148.0758

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp Cor	A	2-Theta	D Spacing	St. Dev.
0.0	0.00029	165.29	905.5	3.63	0.27518		161.95	0.779935	0.000024
5.0	0.00484	166.43	926.1	3.21	0.27157		162.02	0.779856	0.000023
10.0	0.02463	165.11	894.6	3.35	0.27221		161.94	0.779944	0.000027
15.0	0.05835	166.82	917.4	3.73	0.27733		162.04	0.779836	0.000029
20.0	0.10490	169.44	762.4	3.45	0.27706		162.20	0.779664	0.000047
25.0	0.16529	166.33	688.4	3.00	0.26829		162.02	0.779859	0.000038
30.0	0.23383	168.82	817.4	3.78	0.27959		162.16	0.779707	0.000042
35.0	0.31174	168.05	852.9	3.60	0.27747		162.12	0.779755	0.000023
40.0	0.39475	168.50	869.0	3.18	0.27265		162.15	0.779721	0.000025
45.0	0.48120	168.62	881.6	3.42	0.27600		162.15	0.779716	0.000021

Fitted Delta D vs Sin^2(psi) Data:

D Spacing Intercept.....: 0.779870  
Slope of Fitted Line.....: -0.0003953  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -4.0 KSI -27.8 MPa

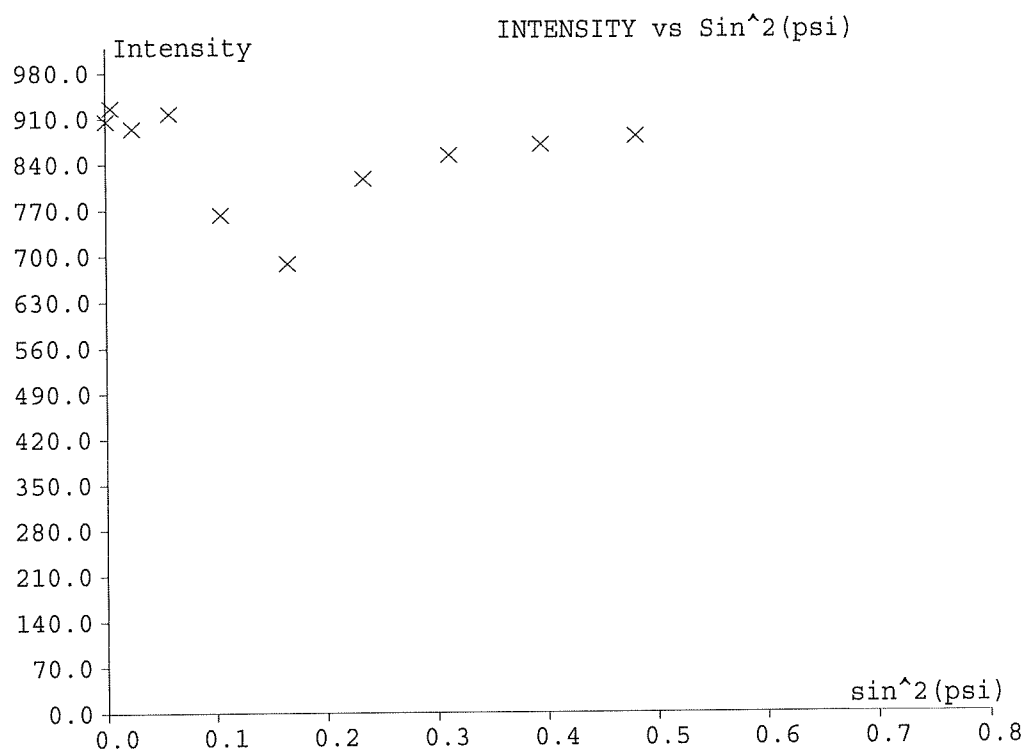
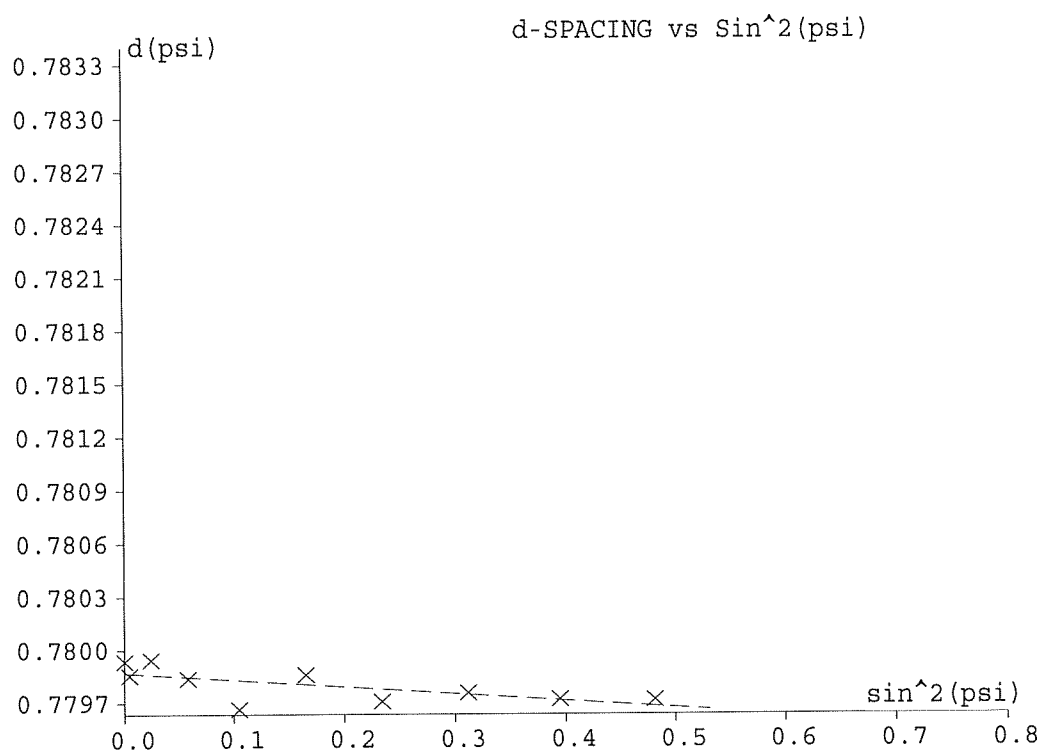
Counting Statistics Stress Error (+/-): 0.5 KSI 3.4 MPa  
Probable error.....(+/-): 1.5 KSI 10.6 MPa

File: C:\STRESS\DATA\2005\SBIR\50632\19373.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 6 / 1.5" from Hole / Baseline / Transverse / ebm

*Residual Stress.....:	-4.0 KSI	-27.8 MPa
Counting Statistics Stress Error (+/-):	0.5 KSI	3.4 MPa
Probable error.....(+/-):	1.5 KSI	10.6 MPa



===== TEC Stress Analyzer v1.64 =====  
 ===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2005\SBIR\50632\19374.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 7 / 1.5" from Hole / Baseline / Transverse / ebm

Acquisition date & time: 8/22/2005 2:33pm

Material [hkl].....: Al 5083-H23 [333]  
 Depth.....: 0.0000000  
 Phi angle.....: 0.00  
 Collimator.....: Round\_4mm  
 Bracket.....: 160s  
 Peak Bounding Range [percent].....: 20  
 X-ray Target Description and Wavelength: copper 1.54056  
 PSI Oscillation Angle Range.....: 2.00  
 Spectra count time (PSI=0).....: 30.0  
 High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
 ADC Channels Full Scale.....: 256  
 Detector Calibration Coefficients:  
 A 1.42245E-08 B -5.2884E-06 C 0.0618978 D 148.0758

Psi	Sin <sup>2</sup> (psi)	Pk Chan	Intens	FWHM	Kalp	Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00023	161.69	906.5	3.90	0.27364		161.73	0.780173	0.000041
5.0	0.00525	160.97	947.9	3.33	0.26865		161.69	0.780216	0.000025
10.0	0.02537	160.58	834.5	3.41	0.26908		161.67	0.780243	0.000025
15.0	0.05916	163.51	906.7	3.35	0.27087		161.85	0.780049	0.000028
20.0	0.10723	162.24	826.7	3.29	0.26924		161.77	0.780132	0.000031
25.0	0.16663	163.05	875.0	3.64	0.27319		161.82	0.780082	0.000025
30.0	0.23642	163.00	739.9	3.51	0.27213		161.81	0.780084	0.000030
35.0	0.31384	163.70	753.1	3.26	0.27007		161.86	0.780035	0.000027
40.0	0.39731	163.65	807.2	3.64	0.27370		161.85	0.780043	0.000029
45.0	0.48270	165.74	855.1	3.19	0.27068		161.98	0.779901	0.000031

Fitted Delta D vs Sin<sup>2</sup>(psi) Data:

D Spacing Intercept.....: 0.780186  
 Slope of Fitted Line.....: -0.0005018  
 Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -5.1 KSI -35.3 MPa

Counting Statistics Stress Error (+/-): 0.6 KSI 4.2 MPa

Probable error.....(+/-): 1.1 KSI 7.4 MPa

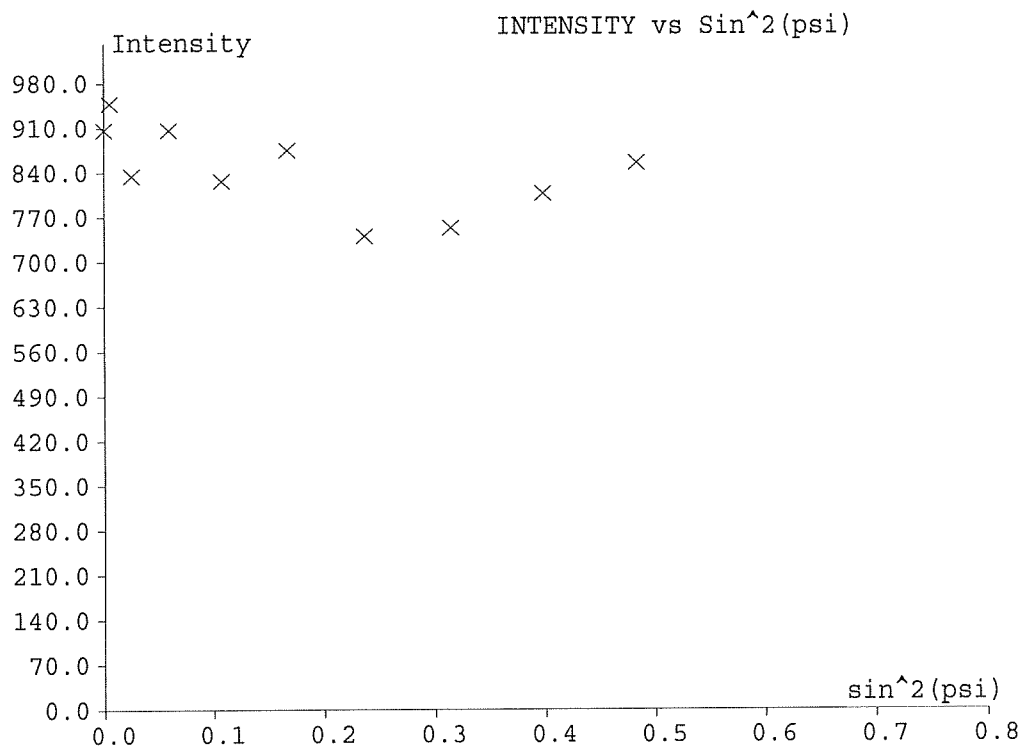
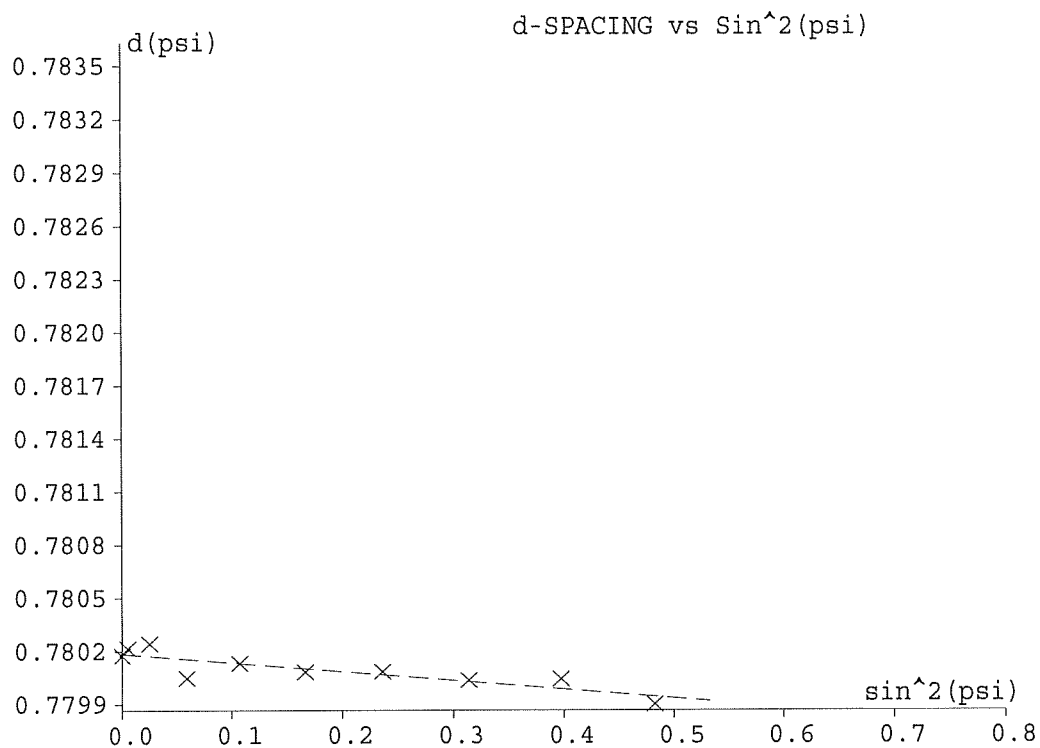
Warning: Counting statistics may be the controlling error!

File: C:\STRESS\DATA\2005\SBIR\50632\19374.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 7 / 1.5" from Hole / Baseline / Transverse / ebm

*Residual Stress.....	-5.1 KSI	-35.3 MPa
Counting Statistics Stress Error (+/-):	0.6 KSI	4.2 MPa
Probable error.....(+/-):	1.1 KSI	7.4 MPa





===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2005\SBIR\50632\19375.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 8 / 1.5" from Hole / Baseline / Transverse / ebm

Acquisition date & time: 8/22/2005 2:43pm

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 30.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A 1.42245E-08 B -5.2884E-06 C 0.0618978 D 148.0758

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp Cor	A	2-Theta	D Spacing	St. Dev.
0.0	0.00026	163.49	1076.9	3.13	0.26813		161.85	0.780047	0.000021
5.0	0.00504	163.78	874.8	3.60	0.27353		161.86	0.780034	0.000034
10.0	0.02481	164.02	874.3	3.68	0.27438		161.87	0.780019	0.000029
15.0	0.05930	162.95	954.6	3.38	0.27075		161.81	0.780086	0.000030
20.0	0.10675	163.77	793.6	3.59	0.27347		161.86	0.780034	0.000034
25.0	0.16622	164.07	829.6	3.43	0.27225		161.88	0.780013	0.000029
30.0	0.23594	164.06	818.5	3.44	0.27236		161.88	0.780014	0.000025
35.0	0.31334	164.75	865.2	3.39	0.27233		161.92	0.779968	0.000030
40.0	0.39655	165.05	876.0	3.23	0.27085		161.94	0.779946	0.000024
45.0	0.48368	163.77	1004.7	2.82	0.26292		161.87	0.780023	0.000019

Fitted Delta D vs Sin^2(psi) Data:

D Spacing Intercept.....: 0.780044  
Slope of Fitted Line.....: -0.0001435  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -1.5 KSI -10.1 MPa

Counting Statistics Stress Error (+/-): 0.5 KSI 3.4 MPa

Probable error.....(+/-): 0.6 KSI 4.3 MPa

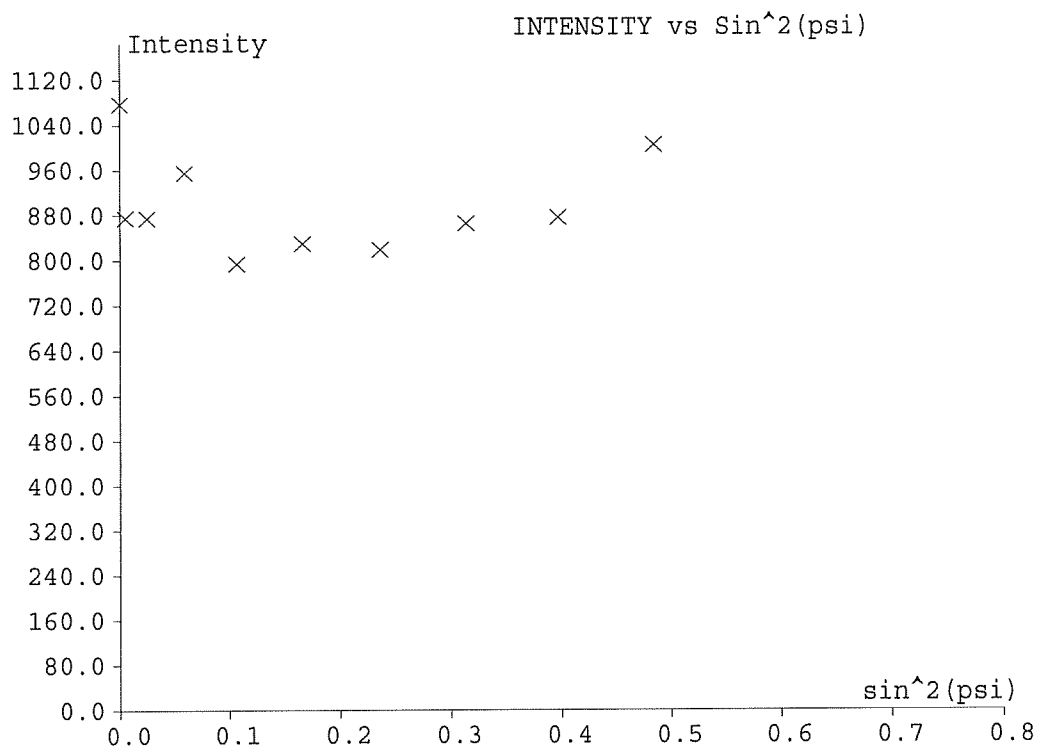
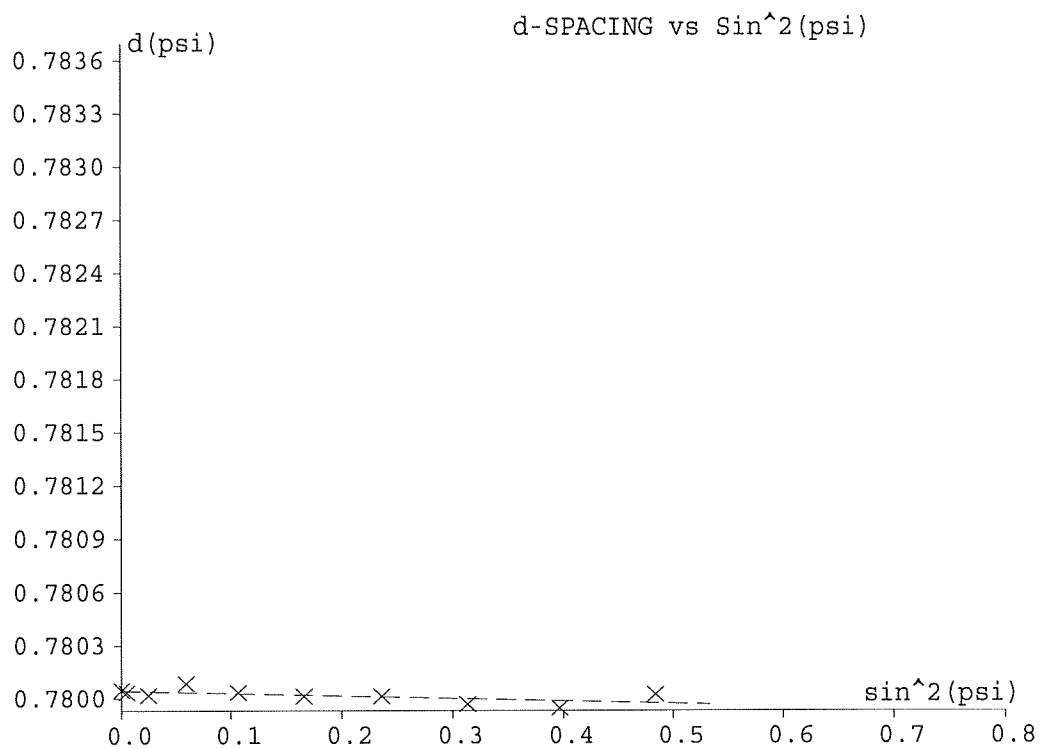
Warning: Counting statistics may be the controlling error!

File: C:\STRESS\DATA\2005\SBIR\50632\19375.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 8 / 1.5" from Hole / Baseline / Transverse / ebm

*Residual Stress.....:	-1.5 KSI	-10.1 MPa
Counting Statistics Stress Error (+/-):	0.5 KSI	3.4 MPa
Probable error.....(+/-):	0.6 KSI	4.3 MPa



===== TEC Stress Analyzer v1.64 =====  
 ===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2005\SBIR\50632\19376.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 9 / 1.5" from Hole / Baseline / Transverse / ebm

Acquisition date & time: 8/22/2005 2:55pm

Material [hkl].....: Al 5083-H23 [333]  
 Depth.....: 0.0000000  
 Phi angle.....: 0.00  
 Collimator.....: Round\_4mm  
 Bracket.....: 160s  
 Peak Bounding Range [percent].....: 20  
 X-ray Target Description and Wavelength: copper 1.54056  
 PSI Oscillation Angle Range.....: 2.00  
 Spectra count time (PSI=0).....: 30.0  
 High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
 ADC Channels Full Scale.....: 256  
 Detector Calibration Coefficients:  
 A 1.42245E-08 B -5.2884E-06 C 0.0618978 D 148.0758

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00034	168.01	875.2	3.38	0.27506	162.12	0.779756	0.000035
5.0	0.00479	167.01	922.4	3.31	0.27330	162.06	0.779819	0.000024
10.0	0.02400	168.99	842.8	3.56	0.27799	162.18	0.779694	0.000039
15.0	0.05813	167.58	864.5	3.05	0.27000	162.10	0.779778	0.000023
20.0	0.10545	167.77	958.2	3.54	0.27674	162.10	0.779773	0.000029
25.0	0.16436	168.80	841.6	3.45	0.27654	162.17	0.779705	0.000025
30.0	0.23333	169.92	791.1	3.63	0.27945	162.23	0.779635	0.000022
35.0	0.31205	167.41	732.7	3.52	0.27619	162.08	0.779796	0.000020
40.0	0.39506	167.89	951.5	3.13	0.27146	162.11	0.779759	0.000018
45.0	0.48043	170.06	900.3	3.30	0.27571	162.24	0.779622	0.000019

Fitted Delta D vs Sin^2(psi) Data:

D Spacing Intercept.....: 0.779765  
 Slope of Fitted Line.....: -0.0001727  
 Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -1.8 KSI -12.2 MPa

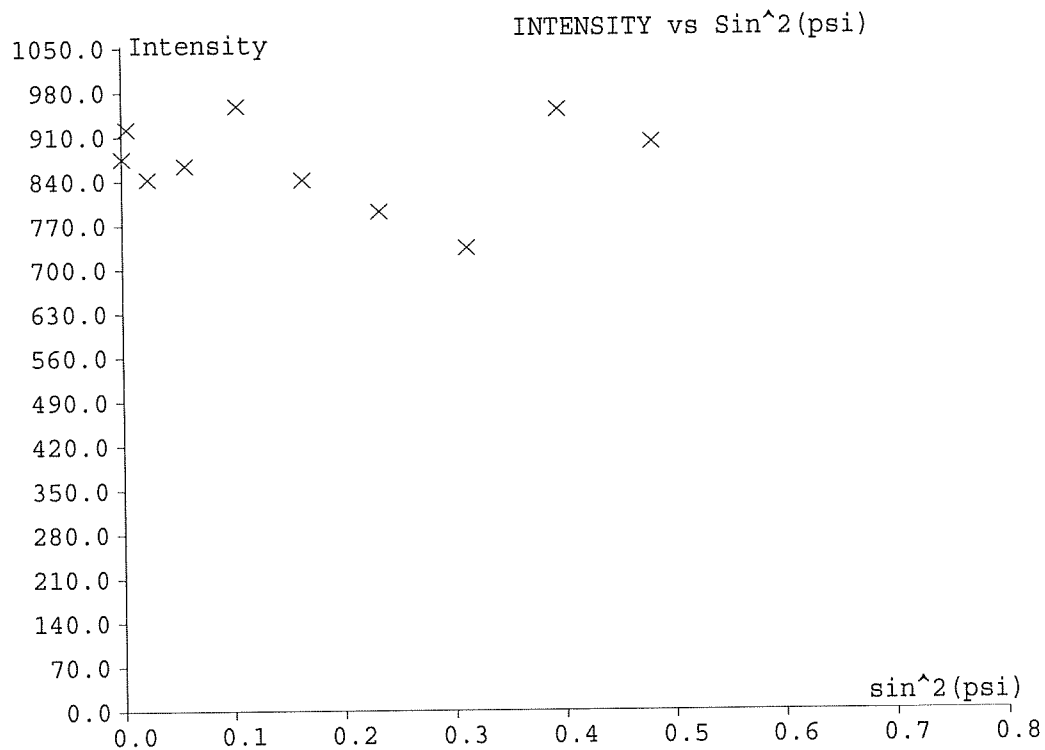
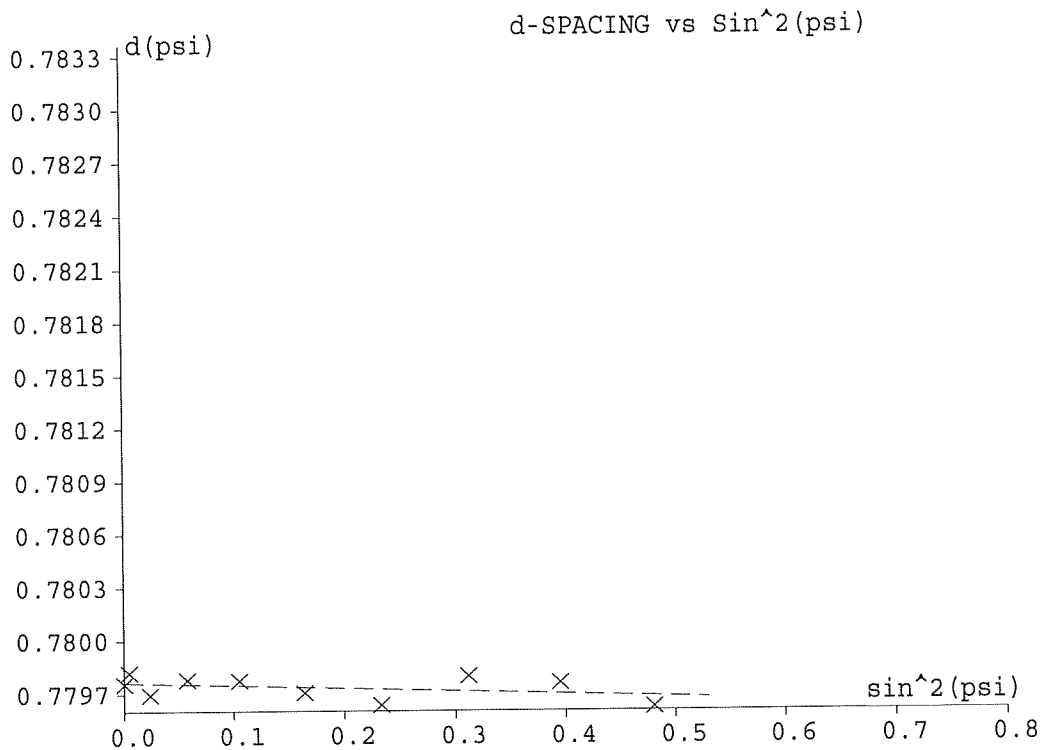
Counting Statistics Stress Error (+/-): 0.5 KSI 3.4 MPa  
 Probable error.....(+/-): 1.3 KSI 8.7 MPa

File: C:\STRESS\DATA\2005\SBIR\50632\19376.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 9 / 1.5" from Hole / Baseline / Transverse / ebm

*Residual Stress.....:	-1.8 KSI	-12.2 MPa
Counting Statistics Stress Error (+/-):	0.5 KSI	3.4 MPa
Probable error.....(+/-):	1.3 KSI	8.7 MPa



===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2005\SBIR\50632\19377.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 10 / 1.5" from Hole / Baseline / Transverse / ebm

Acquisition date & time: 8/22/2005 3:07pm

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 30.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A 1.42245E-08 B -5.2884E-06 C 0.0618978 D 148.0758

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00022	161.21	1063.4	2.89	0.26249	161.71	0.780193	0.000023
5.0	0.00521	161.43	949.9	3.44	0.27008	161.72	0.780187	0.000033
10.0	0.02502	162.69	896.8	3.37	0.27039	161.80	0.780103	0.000031
15.0	0.05891	164.54	913.0	3.66	0.27470	161.91	0.779984	0.000027
20.0	0.10728	162.10	894.9	3.27	0.26888	161.76	0.780141	0.000025
25.0	0.16660	163.05	850.9	3.25	0.26944	161.82	0.780078	0.000033
30.0	0.23381	168.82	828.7	3.52	0.27742	162.17	0.779705	0.000032
35.0	0.31367	164.08	887.3	3.44	0.27233	161.88	0.780012	0.000026
40.0	0.39729	163.57	856.9	3.07	0.26721	161.85	0.780040	0.000021
45.0	0.48327	164.68	896.7	3.28	0.27109	161.92	0.779971	0.000020

Fitted Delta D vs Sin^2(psi) Data:

D Spacing Intercept.....: 0.780113  
Slope of Fitted Line.....: -0.0003992  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -4.1 KSI -28.1 MPa

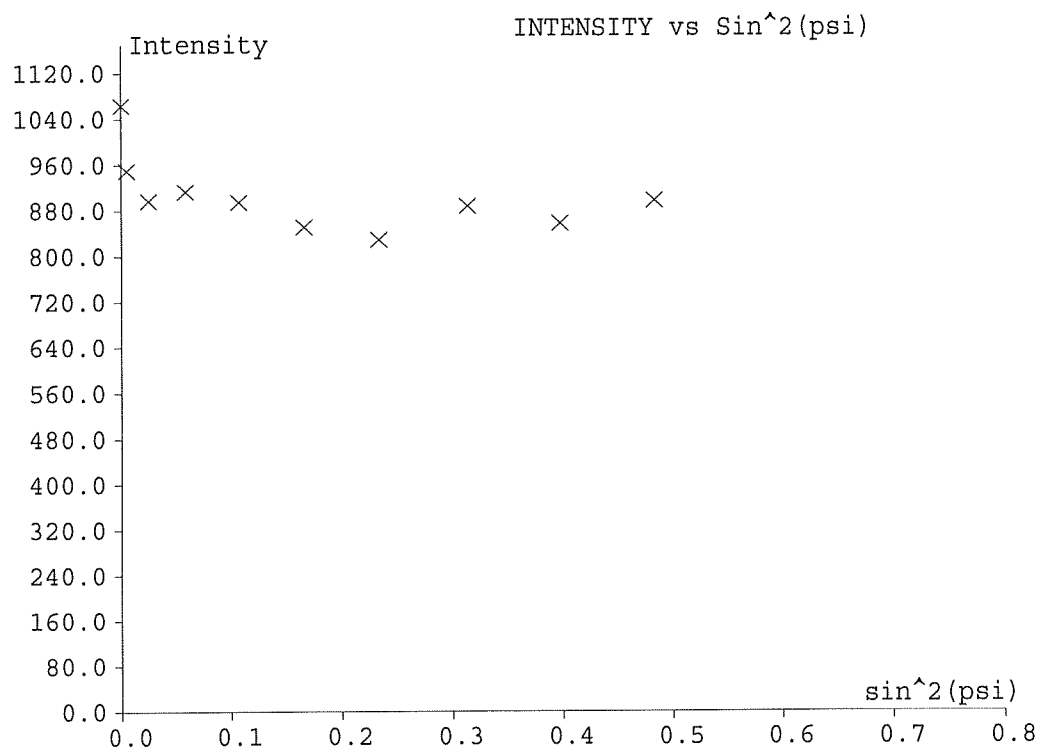
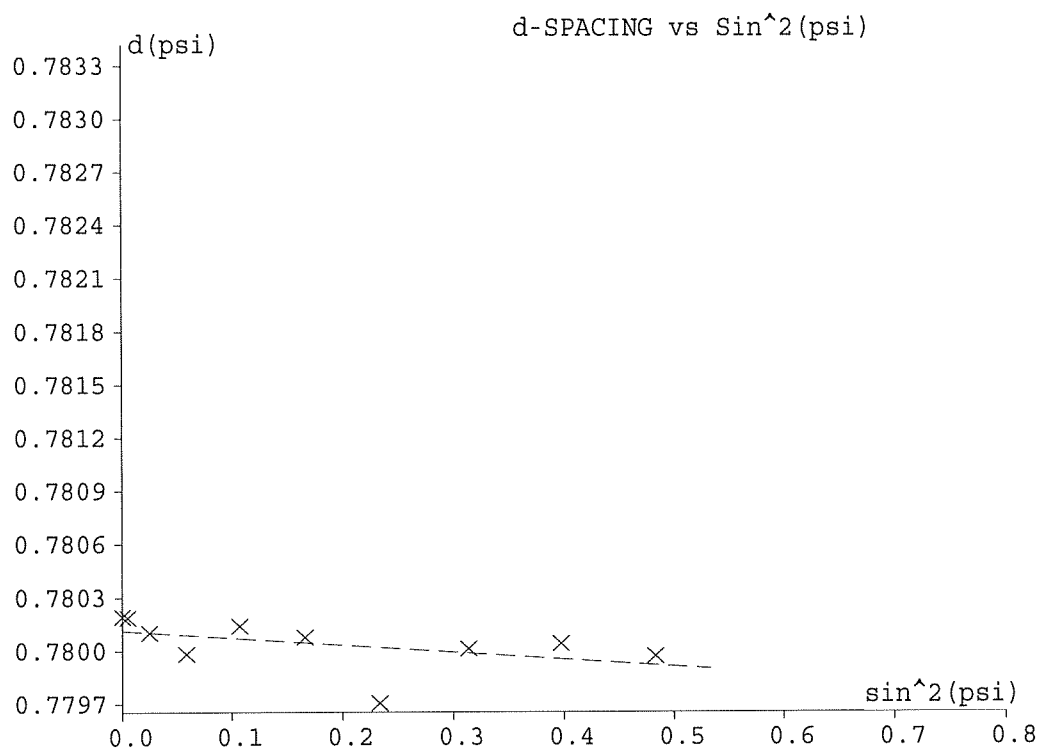
Counting Statistics Stress Error (+/-): 0.5 KSI 3.3 MPa  
Probable error.....(+/-): 2.6 KSI 18.0 MPa

File: C:\STRESS\DATA\2005\SBIR\50632\19377.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 10 / 1.5" from Hole / Baseline / Transverse / ebm

*Residual Stress.....:	-4.1 KSI	-28.1 MPa
Counting Statistics Stress Error (+/-):	0.5 KSI	3.3 MPa
Probable error.....(+/-):	2.6 KSI	18.0 MPa



===== TEC Stress Analyzer v1.64 =====  
 ===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2005\SBIR\50632\19379.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 12 / 1.5" from Hole / Baseline / Transverse / ebm

Acquisition date & time: 8/22/2005 3:22pm

Material [hkl].....: Al 5083-H23 [333]  
 Depth.....: 0.0000000  
 Phi angle.....: 0.00  
 Collimator.....: Round\_4mm  
 Bracket.....: 160s  
 Peak Bounding Range [percent].....: 20  
 X-ray Target Description and Wavelength: copper 1.54056  
 PSI Oscillation Angle Range.....: 2.00  
 Spectra count time (PSI=0).....: 30.0  
 High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
 ADC Channels Full Scale.....: 256  
 Detector Calibration Coefficients:  
 A 1.42245E-08 B -5.2884E-06 C 0.0618978 D 148.0758

Psi	Sin <sup>2</sup> (psi)	Pk Chan	Intens	FWHM	Kalp Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00026	163.59	1044.5	3.63	0.27360	161.85	0.780047	0.000028
5.0	0.00517	161.97	1024.7	3.21	0.26812	161.75	0.780149	0.000024
10.0	0.02525	161.30	957.0	3.28	0.26839	161.71	0.780194	0.000030
15.0	0.05886	164.72	855.3	3.60	0.27439	161.92	0.779972	0.000029
20.0	0.10614	165.60	810.6	3.35	0.27267	161.97	0.779912	0.000037
25.0	0.16705	161.97	830.0	3.57	0.27167	161.75	0.780153	0.000022
30.0	0.23534	165.40	721.4	3.49	0.27402	161.96	0.779926	0.000033
35.0	0.31354	164.34	686.1	3.40	0.27218	161.90	0.779995	0.000027
40.0	0.39747	163.21	1042.6	3.01	0.26613	161.83	0.780063	0.000023
45.0	0.48117	168.74	883.1	3.75	0.27928	162.16	0.779712	0.000038

Fitted Delta D vs Sin<sup>2</sup>(psi) Data:

D Spacing Intercept.....: 0.780102  
 Slope of Fitted Line.....: -0.0005035  
 Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -5.1 KSI -35.5 MPa

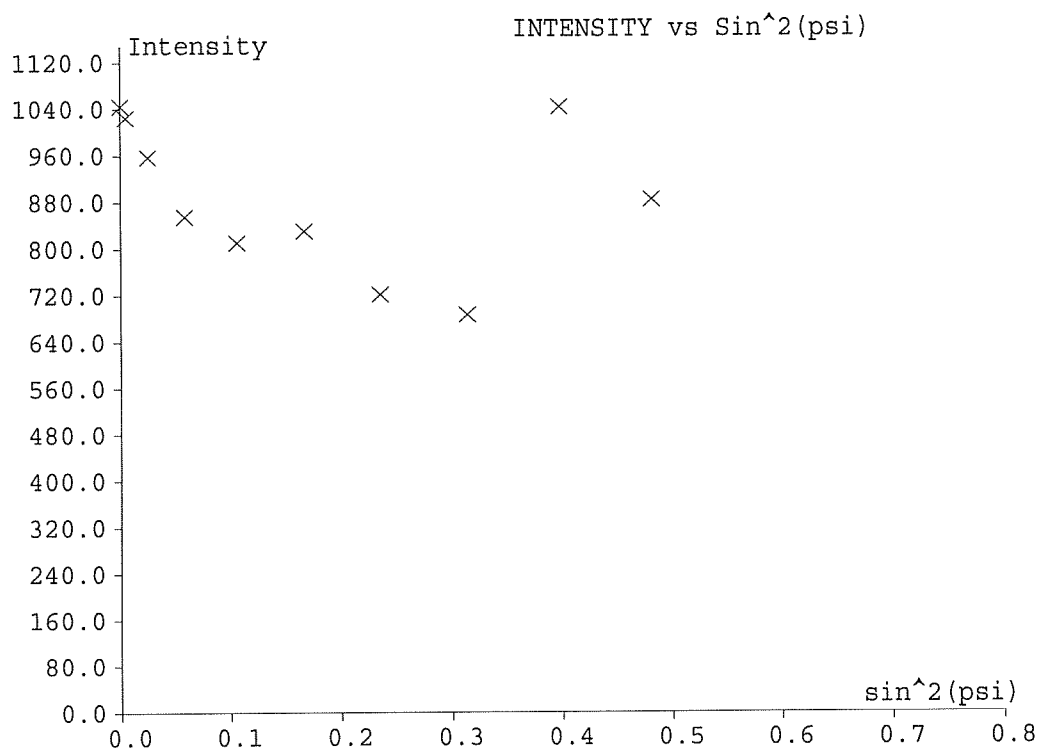
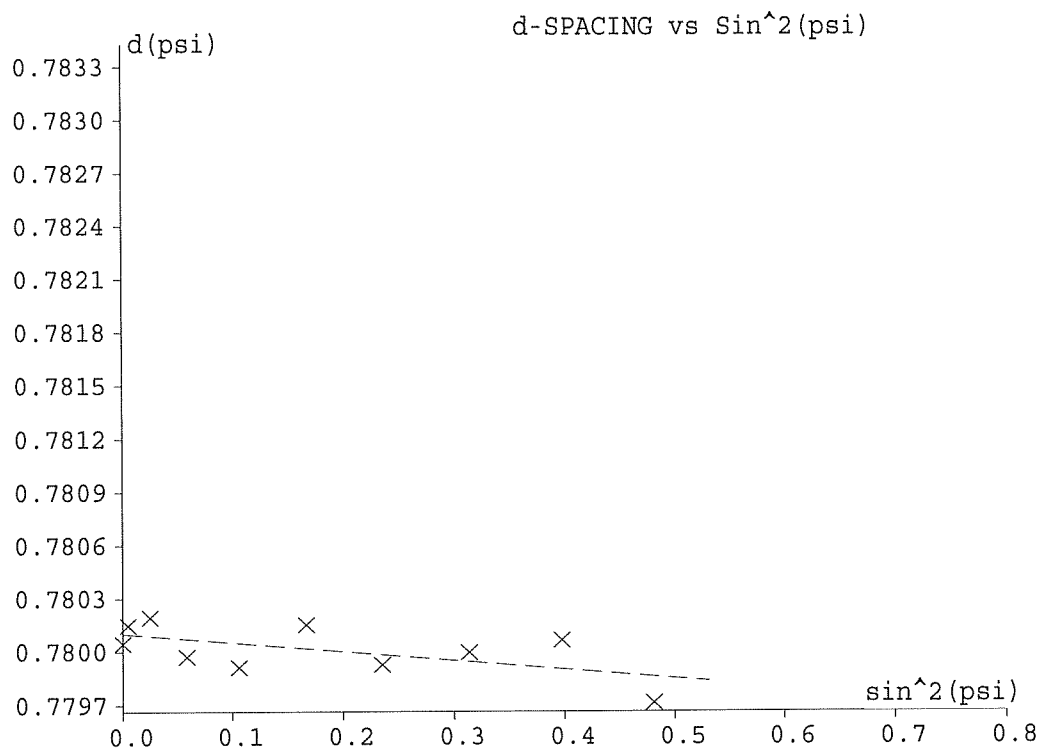
Counting Statistics Stress Error (+/-): 0.6 KSI 4.2 MPa  
 Probable error.....(+/-): 2.4 KSI 16.5 MPa

File: C:\STRESS\DATA\2005\SBIR\50632\19379.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 12 / 1.5" from Hole / Baseline / Transverse / ebm

*Residual Stress.....:	-5.1 KSI	-35.5 MPa
Counting Statistics Stress Error (+/-):	0.6 KSI	4.2 MPa
Probable error.....(+/-):	2.4 KSI	16.5 MPa





===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2005\SBIR\50632\19380.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 13 / 1.5" from Hole / Baseline / Transverse / ebm

Acquisition date & time: 8/22/2005 3:30pm

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 30.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A 1.42245E-08 B -5.2884E-06 C 0.0618978 D 148.0758

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00032	166.76	943.7	2.86	0.26576	162.05	0.779828	0.000023
5.0	0.00474	167.40	1078.2	2.39	0.25064	162.11	0.779770	0.000020
10.0	0.02420	167.79	868.7	3.74	0.27836	162.10	0.779774	0.000031
15.0	0.05811	167.76	831.7	3.44	0.27558	162.10	0.779772	0.000029
20.0	0.10522	168.46	707.0	3.56	0.27748	162.14	0.779728	0.000056
25.0	0.16363	170.72	656.1	3.75	0.28112	162.28	0.779585	0.000034
30.0	0.23421	167.97	696.2	3.73	0.27845	162.11	0.779762	0.000028
35.0	0.31091	169.78	711.5	3.76	0.28033	162.22	0.779646	0.000028
40.0	0.39459	168.69	818.8	2.78	0.26537	162.17	0.779700	0.000019
45.0	0.47973	171.33	905.0	3.10	0.27364	162.32	0.779537	0.000019

Fitted Delta D vs Sin^2(psi) Data:

D Spacing Intercept.....: 0.779783  
Slope of Fitted Line.....: -0.0004088  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -4.2 KSI -28.8 MPa

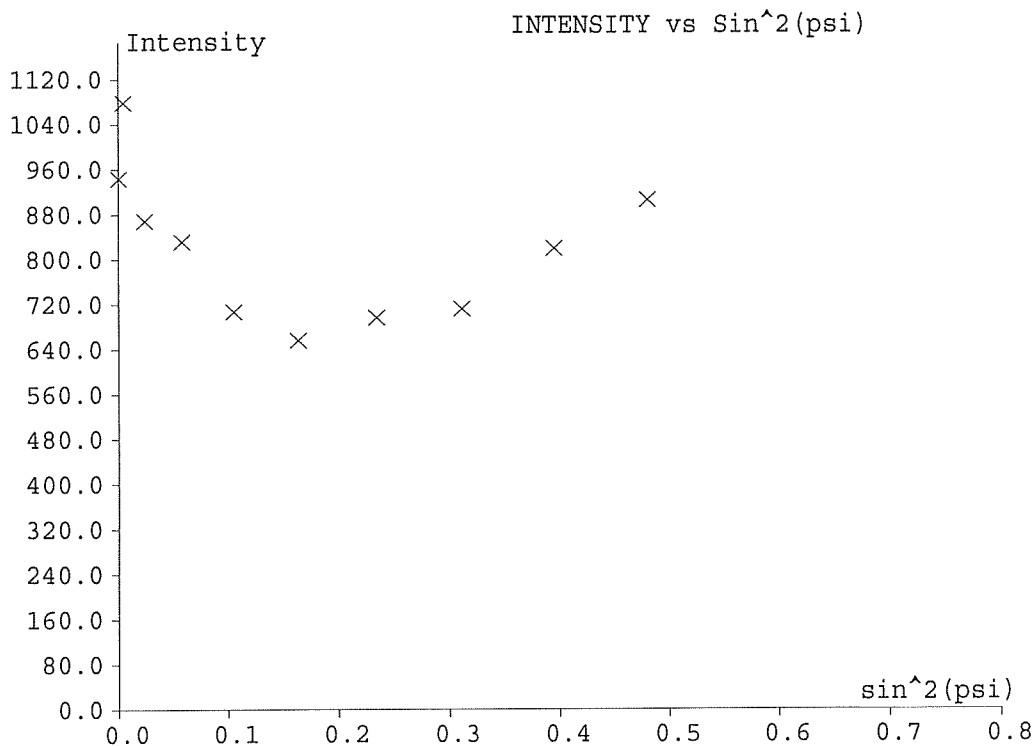
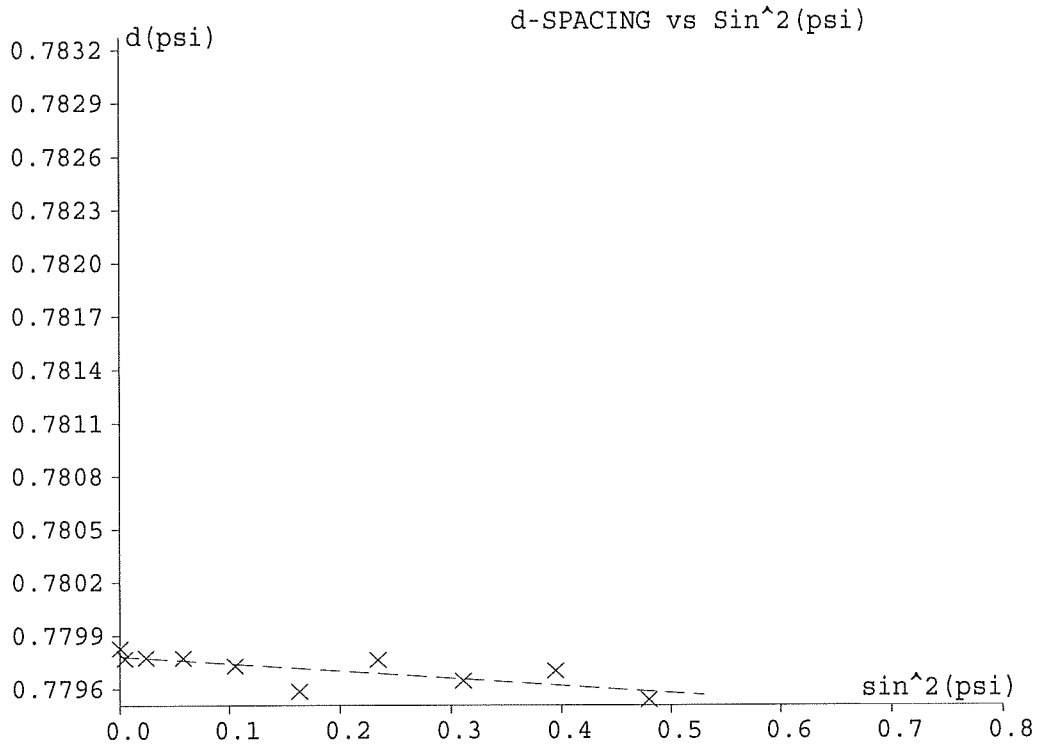
Counting Statistics Stress Error (+/-): 0.5 KSI 3.2 MPa  
Probable error.....(+/-): 1.3 KSI 8.9 MPa

File: C:\STRESS\DATA\2005\SBIR\50632\19380.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 13 / 1.5" from Hole / Baseline / Transverse / ebm

*Residual Stress.....:	-4.2 KSI	-28.8 MPa
Counting Statistics Stress Error (+/-):	0.5 KSI	3.2 MPa
Probable error.....(+/-):	1.3 KSI	8.9 MPa



===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2005\SBIR\50632\19381.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 14 / 1.5" from Hole / Baseline / Transverse / ebm

Acquisition date & time: 8/22/2005 3:38pm

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 30.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A 1.42245E-08 B -5.2884E-06 C 0.0618978 D 148.0758

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp	Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00025	162.91	1014.1	3.45	0.27143		161.81	0.780090	0.000025
5.0	0.00513	162.52	925.0	3.67	0.27294		161.78	0.780117	0.000028
10.0	0.02497	162.92	978.0	3.07	0.26676		161.81	0.780084	0.000023
15.0	0.05904	164.02	852.7	3.51	0.27307		161.88	0.780017	0.000030
20.0	0.10707	162.75	845.6	3.39	0.27073		161.80	0.780099	0.000033
25.0	0.16678	162.65	890.6	3.46	0.27133		161.79	0.780107	0.000029
30.0	0.23500	166.13	771.2	3.36	0.27324		162.00	0.779877	0.000030
35.0	0.31382	163.70	941.7	3.14	0.26836		161.86	0.780033	0.000020
40.0	0.39603	166.12	825.8	3.69	0.27641		162.00	0.779881	0.000029
45.0	0.48315	164.86	907.1	3.12	0.26901		161.93	0.779957	0.000024

Fitted Delta D vs Sin^2(psi) Data:

D Spacing Intercept.....: 0.780094  
Slope of Fitted Line.....: -0.0003794  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -3.9 KSI -26.7 MPa

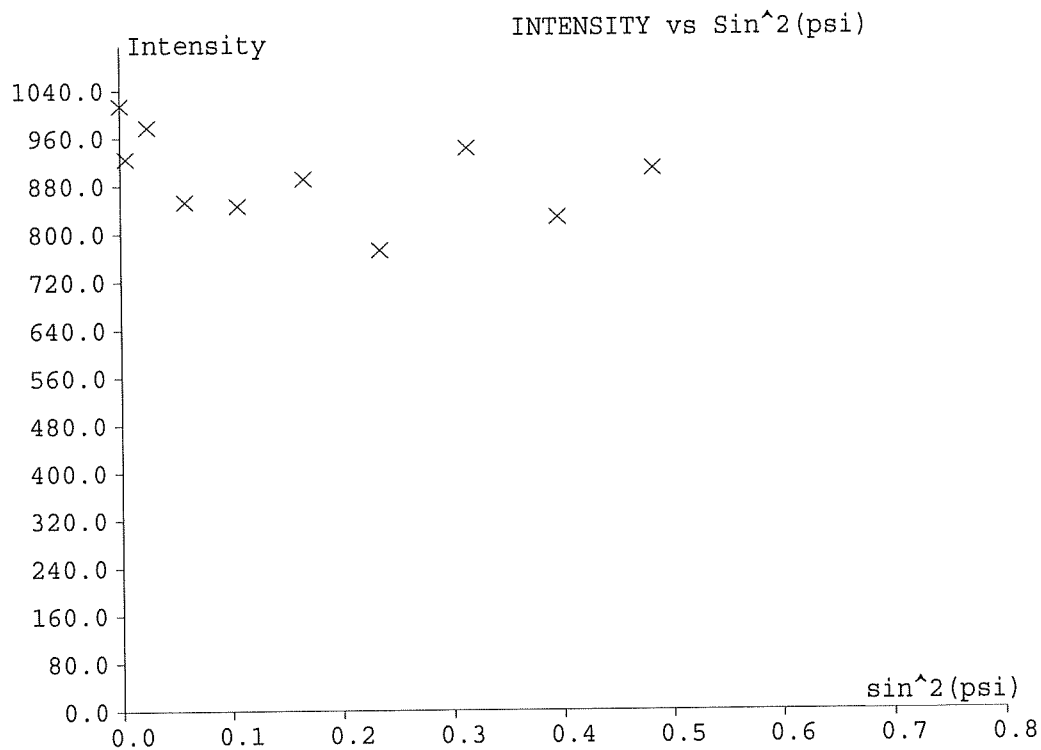
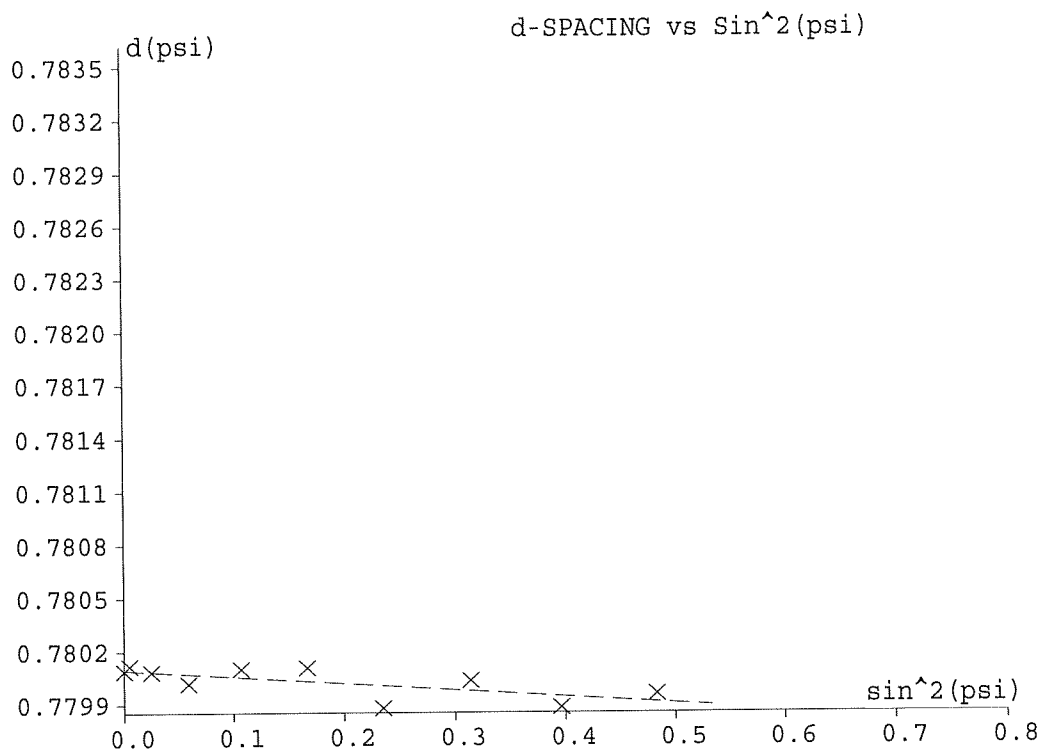
Counting Statistics Stress Error (+/-): 0.5 KSI 3.5 MPa  
Probable error.....(+/-): 1.3 KSI 9.3 MPa

File: C:\STRESS\DATA\2005\SBIR\50632\19381.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 14 / 1.5" from Hole / Baseline / Transverse / ebn

*Residual Stress.....:	-3.9 KSI	-26.7 MPa
Counting Statistics Stress Error (+/-):	0.5 KSI	3.5 MPa
Probable error.....(+/-):	1.3 KSI	9.3 MPa



===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2005\SBIR\50632\19382.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 15 / 1.5" from Hole / Baseline / Transverse / ebm

Acquisition date & time: 8/22/2005 3:53pm

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 30.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A 1.42245E-08 B -5.2884E-06 C 0.0618978 D 148.0758

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00026	163.24	1081.0	3.31	0.27025	161.83	0.780066	0.000026
5.0	0.00509	163.06	976.4	3.48	0.27190	161.82	0.780080	0.000023
10.0	0.02483	163.78	928.3	3.11	0.26810	161.87	0.780027	0.000027
15.0	0.05925	163.13	880.7	3.40	0.27112	161.82	0.780074	0.000031
20.0	0.10729	162.10	780.8	3.46	0.27084	161.76	0.780143	0.000030
25.0	0.16696	162.18	895.1	3.34	0.26971	161.77	0.780137	0.000027
30.0	0.23709	161.47	814.6	3.34	0.26909	161.72	0.780183	0.000027
35.0	0.31426	162.83	827.8	3.24	0.26924	161.81	0.780092	0.000022
40.0	0.39610	165.92	871.8	3.25	0.27173	161.99	0.779890	0.000022
45.0	0.48254	166.11	924.8	3.68	0.27630	162.00	0.779882	0.000026

Fitted Delta D vs Sin^2(psi) Data:

D Spacing Intercept.....: 0.780116  
Slope of Fitted Line.....: -0.0003281  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -3.4 KSI -23.1 MPa

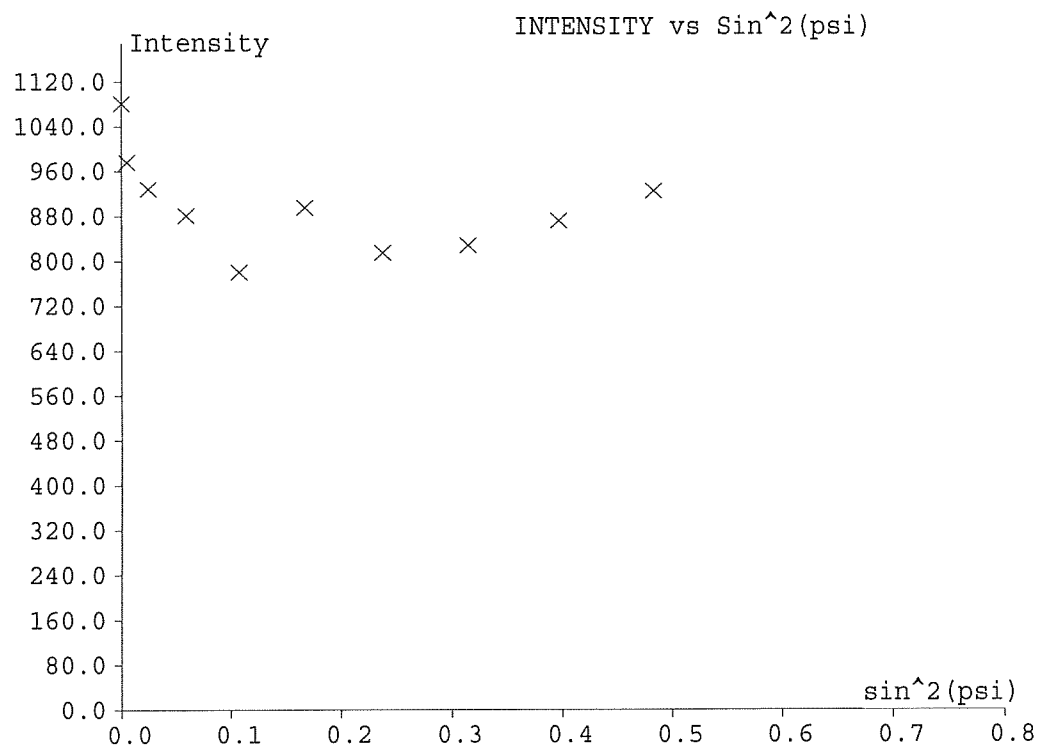
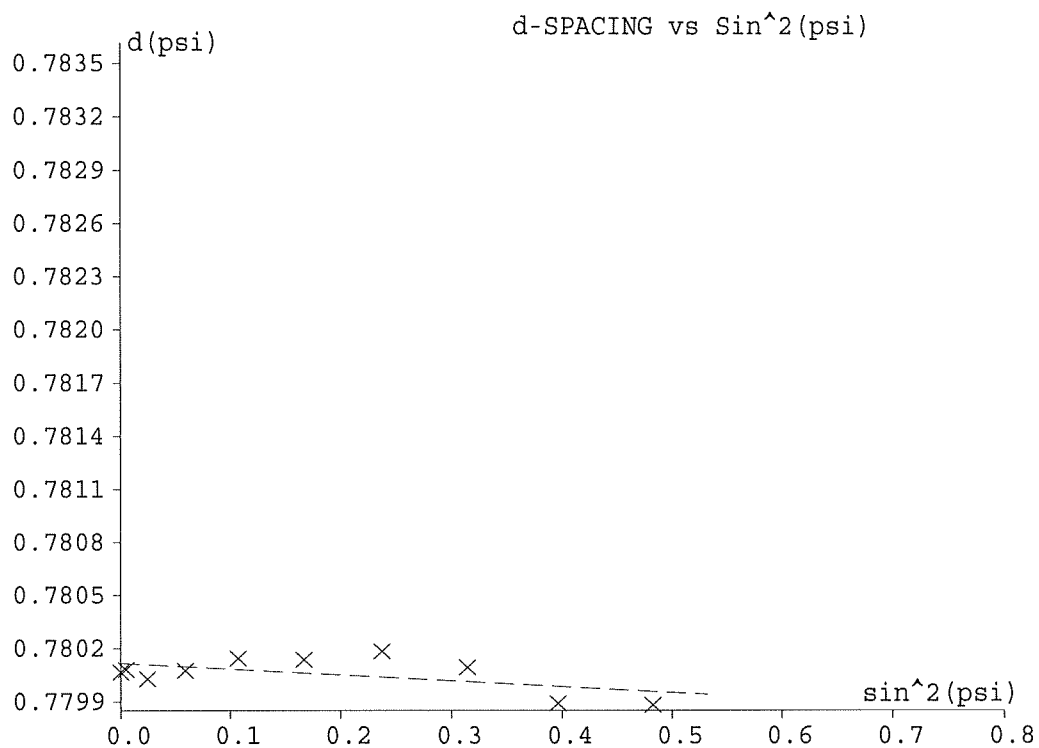
Counting Statistics Stress Error (+/-): 0.5 KSI 3.4 MPa  
Probable error.....(+/-): 1.7 KSI 12.1 MPa

File: C:\STRESS\DATA\2005\SBIR\50632\19382.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 15 / 1.5" from Hole / Baseline / Transverse / ebm

*Residual Stress.....:	-3.4 KSI	-23.1 MPa
Counting Statistics Stress Error (+/-):	0.5 KSI	3.4 MPa
Probable error.....(+/-):	1.7 KSI	12.1 MPa



===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2005\SBIR\50632\19383.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 16 / 1.5" from Hole / Baseline / Transverse / ebm

Acquisition date & time: 8/22/2005 4:03pm

Material [hkl].....: Al 5083-H23 [333]

Depth.....: 0.0000000

Phi angle.....: 0.00

Collimator.....: Round\_4mm

Bracket.....: 160s

Peak Bounding Range [percent].....: 20

X-ray Target Description and Wavelength: copper 1.54056

PSI Oscillation Angle Range.....: 2.00

Spectra count time (PSI=0).....: 30.0

High Voltage(kV) and Beam Current(mA)...: 45.00 1.50

ADC Channels Full Scale.....: 256

Detector Calibration Coefficients:

A 1.42245E-08 B -5.2884E-06 C 0.0618978 D 148.0758

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00025	163.28	843.8	3.77	0.27439	161.83	0.780068	0.000035
5.0	0.00514	162.46	1010.7	3.66	0.27278	161.78	0.780121	0.000022
10.0	0.02485	163.74	957.5	3.29	0.27047	161.86	0.780033	0.000024
15.0	0.05953	162.03	896.3	3.37	0.26984	161.76	0.780147	0.000035
20.0	0.10671	163.86	796.2	3.34	0.27107	161.87	0.780026	0.000029
25.0	0.16544	166.05	909.0	3.43	0.27393	162.00	0.779883	0.000028
30.0	0.23640	162.96	685.7	3.13	0.26775	161.82	0.780082	0.000027
35.0	0.31365	164.06	983.5	3.17	0.26910	161.88	0.780010	0.000022
40.0	0.39743	163.28	939.2	2.99	0.26593	161.84	0.780059	0.000022
45.0	0.48306	165.00	1017.8	3.01	0.26748	161.94	0.779946	0.000020

Fitted Delta D vs Sin^2(psi) Data:

D Spacing Intercept.....: 0.780073

Slope of Fitted Line.....: -0.0002007

Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -2.0 KSI -14.1 MPa

Counting Statistics Stress Error (+/-): 0.5 KSI 3.3 MPa

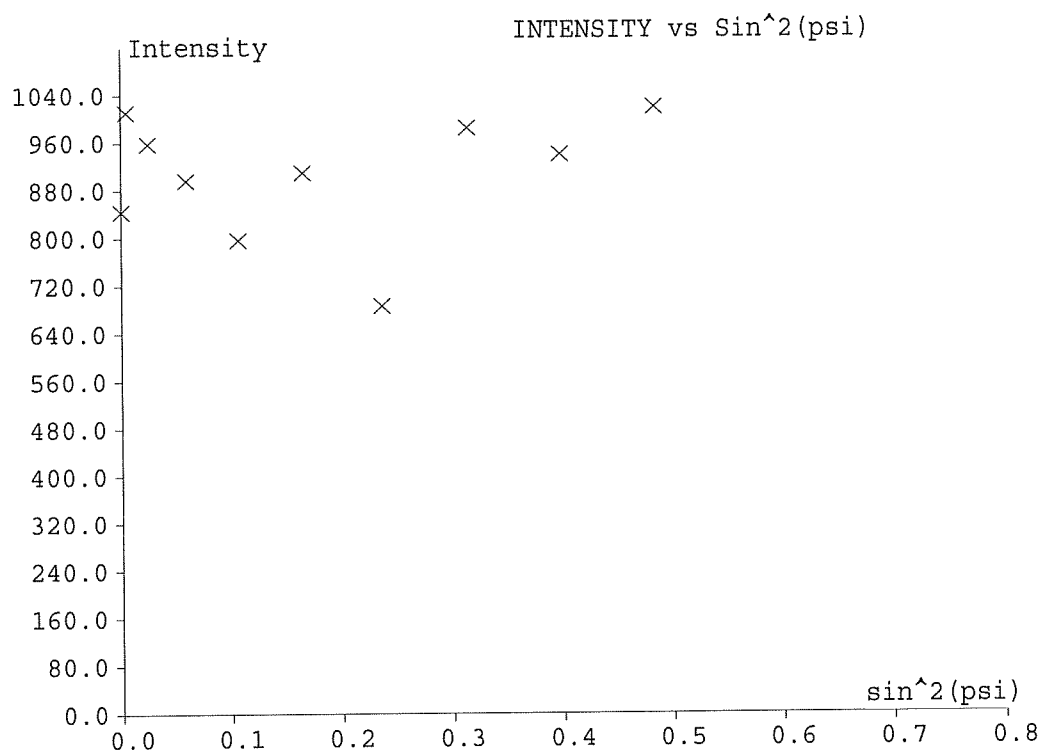
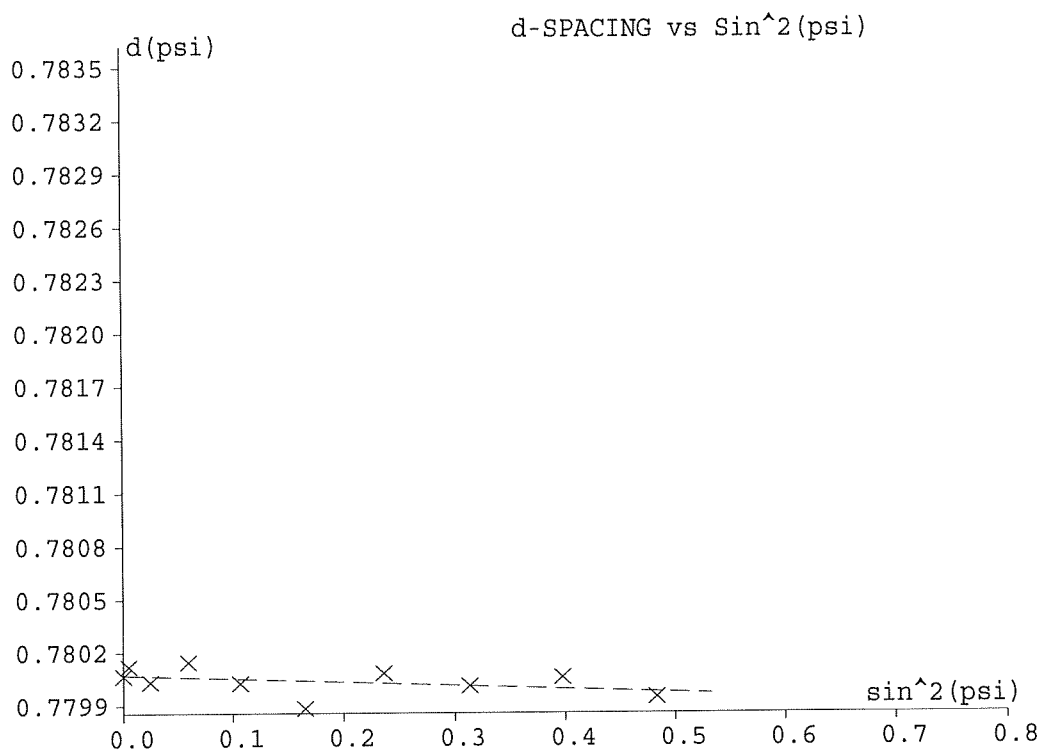
Probable error.....(+/-): 1.5 KSI 10.2 MPa

File: C:\STRESS\DATA\2005\SBIR\50632\19383.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 16 / 1.5" from Hole / Baseline / Transverse / ebm

*Residual Stress.....:	-2.0 KSI	-14.1 MPa
Counting Statistics Stress Error (+/-):	0.5 KSI	3.3 MPa
Probable error.....(+/-):	1.5 KSI	10.2 MPa





===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2005\SBIR\50632\19384.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 17 / 1.5" from Hole / Baseline / Transverse / ebm

Acquisition date & time: 8/22/2005 4:10pm

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 30.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A 1.42245E-08 B -5.2884E-06 C 0.0618978 D 148.0758

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00035	168.26	1002.1	3.30	0.27422	162.13	0.779738	0.000024
5.0	0.00472	168.03	925.7	3.59	0.27733	162.12	0.779757	0.000030
10.0	0.02430	167.13	809.8	3.56	0.27627	162.06	0.779815	0.000031
15.0	0.05801	168.13	772.1	3.41	0.27546	162.13	0.779748	0.000030
20.0	0.10592	166.32	671.2	3.57	0.27567	162.01	0.779867	0.000054
25.0	0.16455	168.34	823.6	3.49	0.27665	162.14	0.779736	0.000028
30.0	0.23442	167.43	811.1	3.40	0.27473	162.08	0.779793	0.000025
35.0	0.31084	169.78	821.8	3.14	0.27303	162.23	0.779637	0.000021
40.0	0.39337	171.27	976.0	3.54	0.27988	162.31	0.779548	0.000027
45.0	0.48125	168.51	1042.6	3.31	0.27459	162.15	0.779722	0.000018

Fitted Delta D vs Sin^2(psi) Data:

D Spacing Intercept.....: 0.779791  
Slope of Fitted Line.....: -0.0003089  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -3.2 KSI -21.8 MPa

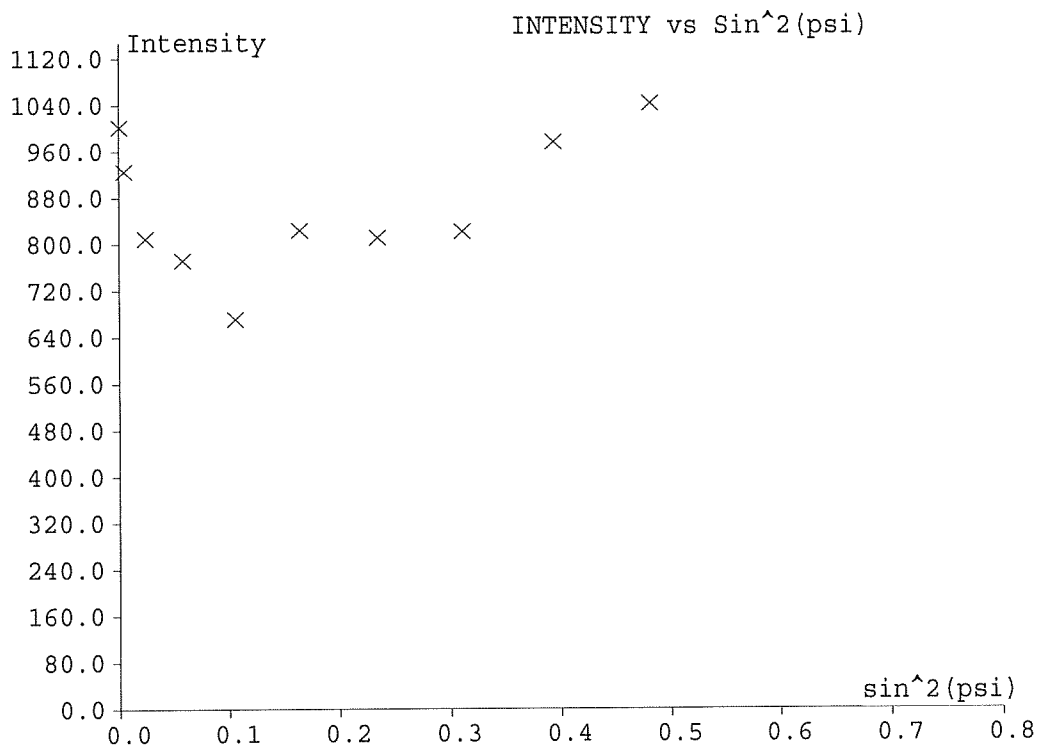
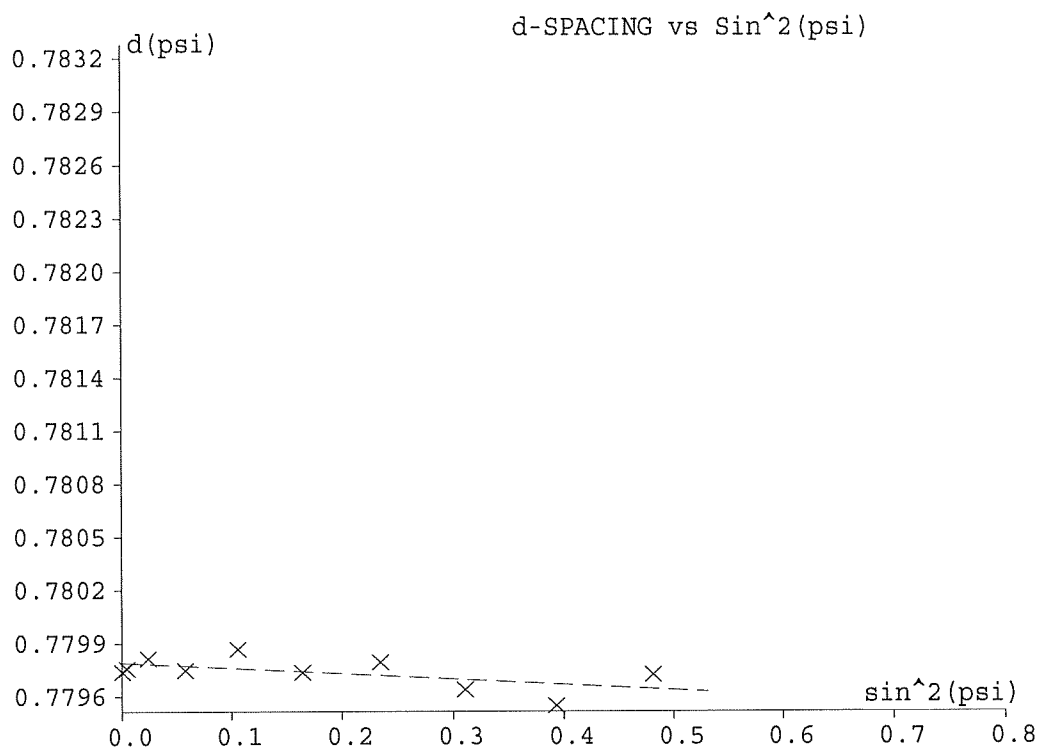
Counting Statistics Stress Error (+/-): 0.5 KSI 3.5 MPa  
Probable error.....(+/-): 1.5 KSI 10.6 MPa

File: C:\STRESS\DATA\2005\SBIR\50632\19384.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 17 / 1.5" from Hole / Baseline / Transverse / ebm

*Residual Stress.....	-3.2 KSI	-21.8 MPa
Counting Statistics Stress Error (+/-):	0.5 KSI	3.5 MPa
Probable error.....(+/-):	1.5 KSI	10.6 MPa



===== TEC Stress Analyzer v1.64 =====  
 ===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2005\SBIR\50632\19385.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 18 / 1.5" from Hole / Baseline / Transverse / ebm

Acquisition date & time: 8/22/2005 4:30pm

Material [hkl].....: Al 5083-H23 [333]  
 Depth.....: 0.0000000  
 Phi angle.....: 0.00  
 Collimator.....: Round\_4mm  
 Bracket.....: 160s  
 Peak Bounding Range [percent].....: 20  
 X-ray Target Description and Wavelength: copper 1.54056  
 PSI Oscillation Angle Range.....: 2.00  
 Spectra count time (PSI=0).....: 30.0  
 High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
 ADC Channels Full Scale.....: 256  
 Detector Calibration Coefficients:  
 A 1.42245E-08 B -5.2884E-06 C 0.0618978 D 148.0758

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00032	167.14	814.1	3.51	0.27582	162.06	0.779813	0.000035
5.0	0.00459	169.88	871.8	3.53	0.27852	162.23	0.779637	0.000032
10.0	0.02385	169.87	1032.4	3.21	0.27429	162.23	0.779633	0.000020
15.0	0.05813	167.64	841.7	3.27	0.27327	162.10	0.779778	0.000033
20.0	0.10588	166.41	876.8	3.36	0.27346	162.02	0.779859	0.000023
25.0	0.16389	169.98	928.3	3.28	0.27532	162.24	0.779627	0.000025
30.0	0.23363	169.22	855.9	3.44	0.27679	162.19	0.779678	0.000024
35.0	0.30965	172.33	997.1	3.55	0.28091	162.38	0.779481	0.000026
40.0	0.39519	167.63	794.2	3.05	0.27005	162.10	0.779775	0.000030
45.0	0.48101	168.97	974.3	3.37	0.27567	162.18	0.779693	0.000018

Fitted Delta D vs Sin^2(psi) Data:

D Spacing Intercept.....: 0.779721  
 Slope of Fitted Line.....: -0.0001302  
 Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -1.3 KSI -9.2 MPa

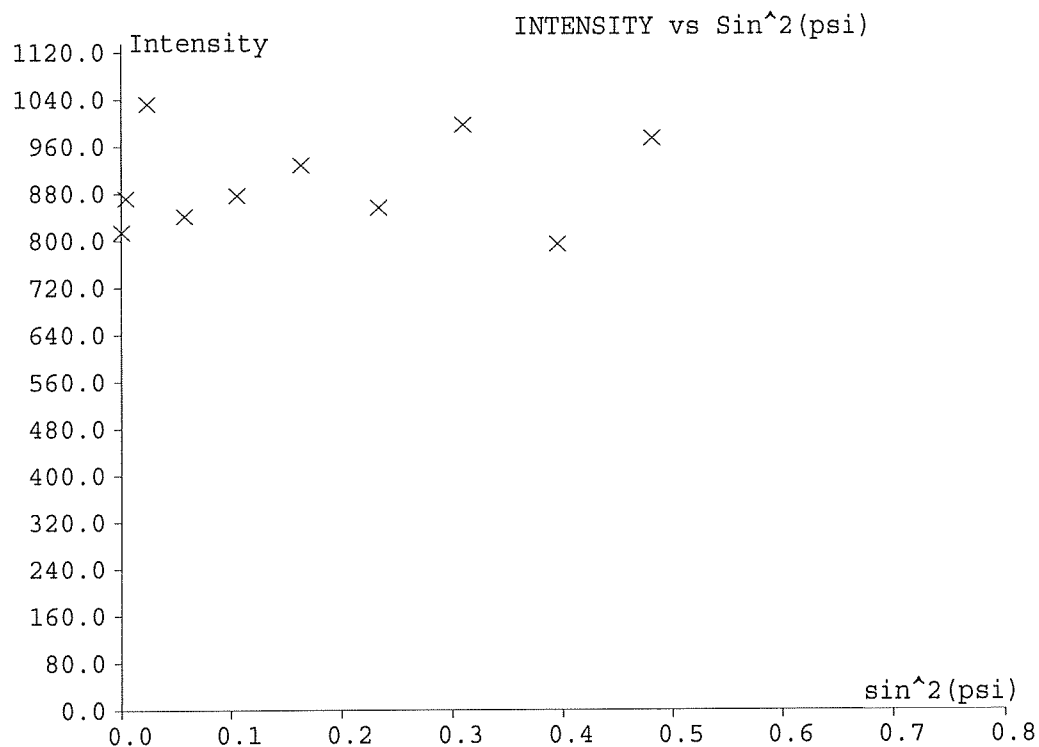
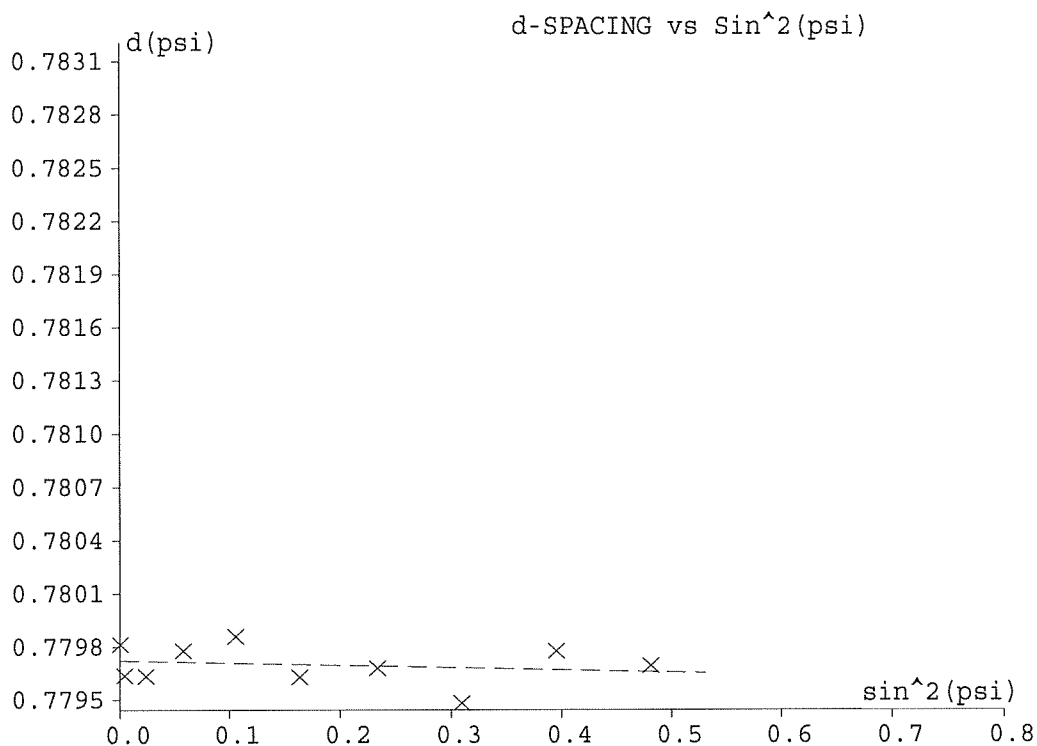
Counting Statistics Stress Error (+/-): 0.5 KSI 3.6 MPa  
 Probable error.....(+/-): 2.3 KSI 15.9 MPa

File: C:\STRESS\DATA\2005\SBIR\50632\19385.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 18 / 1.5" from Hole / Baseline / Transverse / ebm

*Residual Stress.....:	-1.3 KSI	-9.2 MPa
Counting Statistics Stress Error (+/-):	0.5 KSI	3.6 MPa
Probable error.....(+/-):	2.3 KSI	15.9 MPa



===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2005\SBIR\50632\19386.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 19 / 1.5" from Hole / Baseline / Transverse / ebm

Acquisition date & time: 8/22/2005 4:37pm

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 30.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A 1.42245E-08 B -5.2884E-06 C 0.0618978 D 148.0758

Psi	Sin <sup>2</sup> (psi)	Pk Chan	Intens	FWHM	Kalp	Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00023	161.47	958.4	3.69	0.27208		161.72	0.780186	0.000027
5.0	0.00518	161.79	887.8	3.40	0.27002		161.74	0.780163	0.000030
10.0	0.02502	162.74	902.9	3.81	0.27416		161.80	0.780104	0.000035
15.0	0.05922	163.26	915.0	3.34	0.27059		161.83	0.780065	0.000032
20.0	0.10697	163.07	837.8	3.48	0.27193		161.82	0.780079	0.000027
25.0	0.16709	161.85	772.4	3.52	0.27122		161.74	0.780160	0.000034
30.0	0.23686	161.97	801.7	3.26	0.26871		161.75	0.780150	0.000027
35.0	0.31307	165.28	795.4	3.34	0.27222		161.95	0.779932	0.000024
40.0	0.39661	164.96	968.3	3.42	0.27287		161.93	0.779954	0.000023
45.0	0.48353	164.10	834.5	2.96	0.26601		161.89	0.780004	0.000021

Fitted Delta D vs Sin<sup>2</sup>(psi) Data:

D Spacing Intercept.....: 0.780149  
Slope of Fitted Line.....: -0.0003836  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -3.9 KSI -27.0 MPa

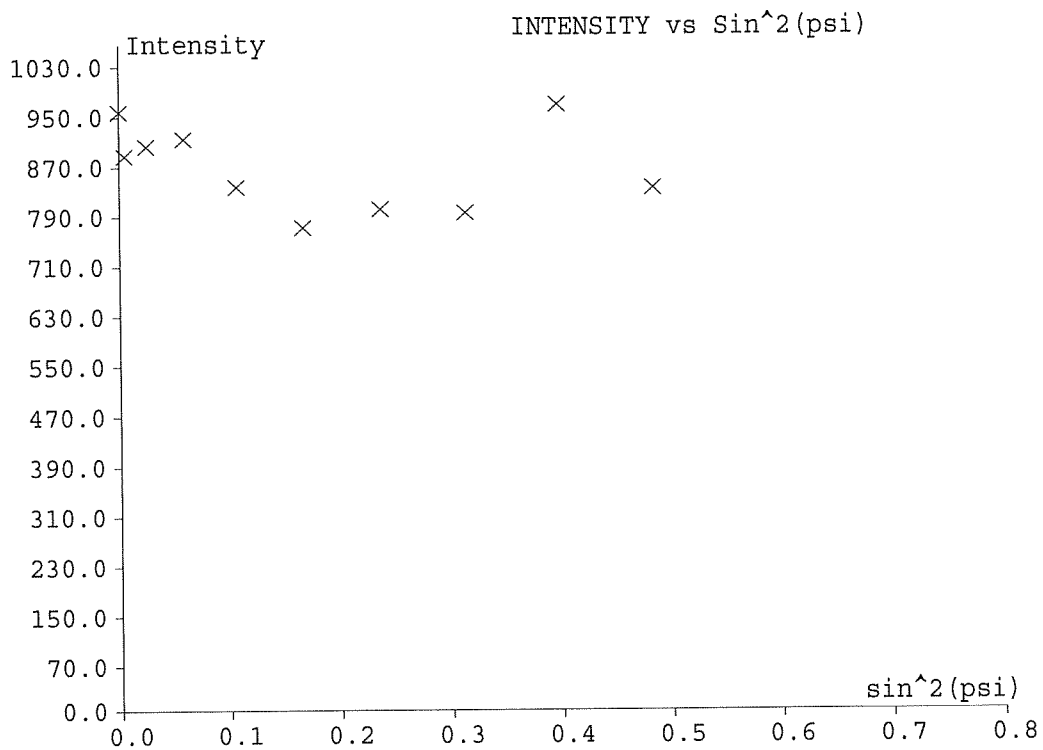
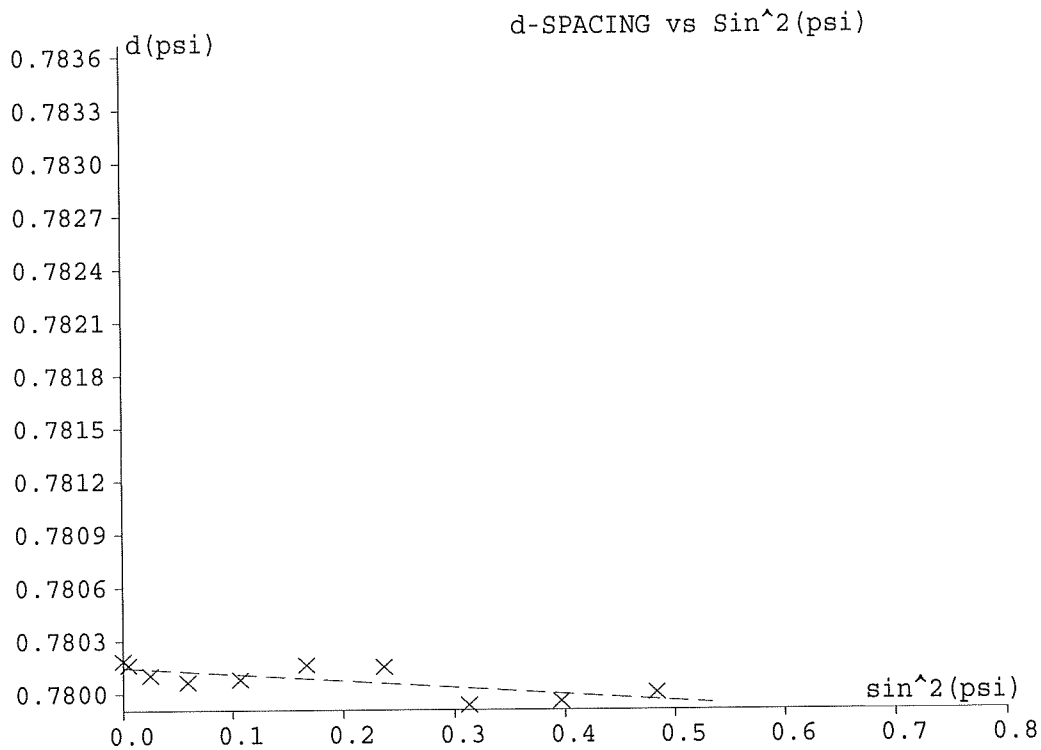
Counting Statistics Stress Error (+/-): 0.5 KSI 3.5 MPa  
Probable error.....(+/-): 1.3 KSI 8.9 MPa

File: C:\STRESS\DATA\2005\SBIR\50632\19386.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 19 / 1.5" from Hole / Baseline / Transverse / ebm

*Residual Stress.....:	-3.9 KSI	-27.0 MPa
Counting Statistics Stress Error (+/-):	0.5 KSI	3.5 MPa
Probable error.....(+/-):	1.3 KSI	8.9 MPa



===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2005\SBIR\50632\19387.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 20 / 1.5" from Hole / Baseline / Transverse / ebm

Acquisition date & time: 8/22/2005 4:45pm

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 30.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A 1.42245E-08 B -5.2884E-06 C 0.0618978 D 148.0758

Psi	Sin <sup>2</sup> (psi)	Pk Chan	Intens	FWHM	Kalp Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00033	167.61	1043.9	3.49	0.27601	162.09	0.779783	0.000027
5.0	0.00470	168.36	875.9	3.77	0.27908	162.14	0.779737	0.000028
10.0	0.02405	168.70	935.7	3.49	0.27696	162.16	0.779712	0.000031
15.0	0.05824	167.23	859.9	3.43	0.27491	162.07	0.779806	0.000024
20.0	0.10528	168.24	913.8	3.31	0.27428	162.13	0.779740	0.000021
25.0	0.16430	168.85	777.2	2.97	0.26951	162.18	0.779695	0.000026
30.0	0.23454	167.20	691.7	3.52	0.27606	162.07	0.779810	0.000022
35.0	0.31041	170.70	826.7	3.28	0.27587	162.28	0.779581	0.000025
40.0	0.39389	170.28	873.2	3.61	0.27956	162.25	0.779612	0.000023
45.0	0.48044	169.96	950.0	3.05	0.27166	162.24	0.779624	0.000017

Fitted Delta D vs Sin<sup>2</sup>(psi) Data:

D Spacing Intercept.....: 0.779770  
Slope of Fitted Line.....: -0.0003409  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -3.5 KSI -24.0 MPa

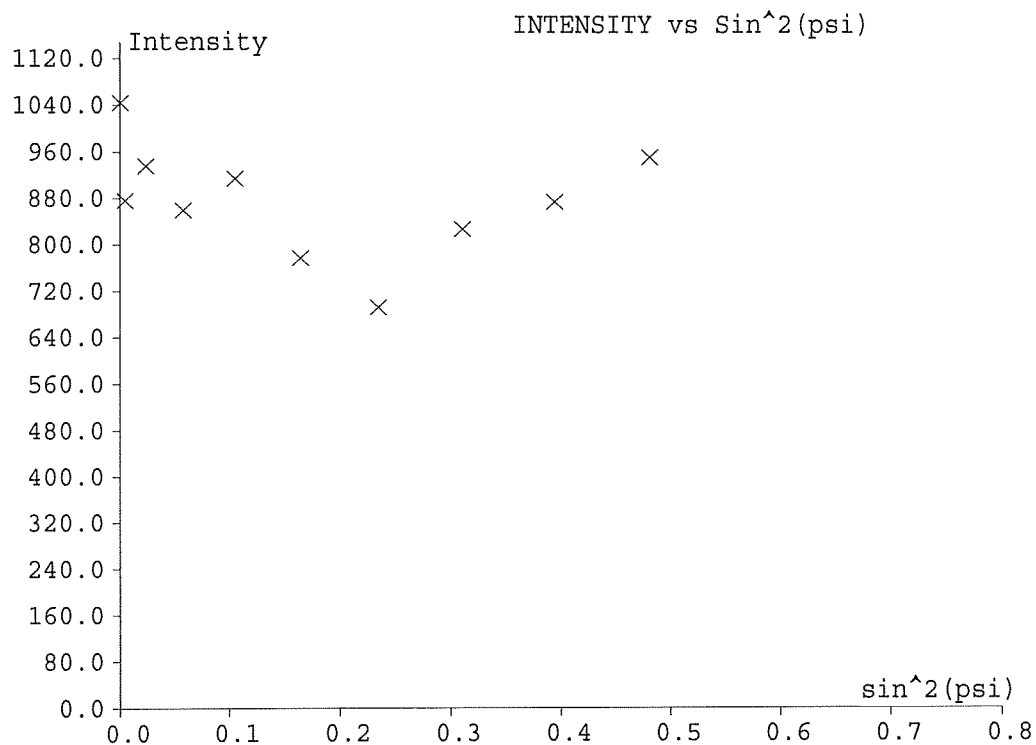
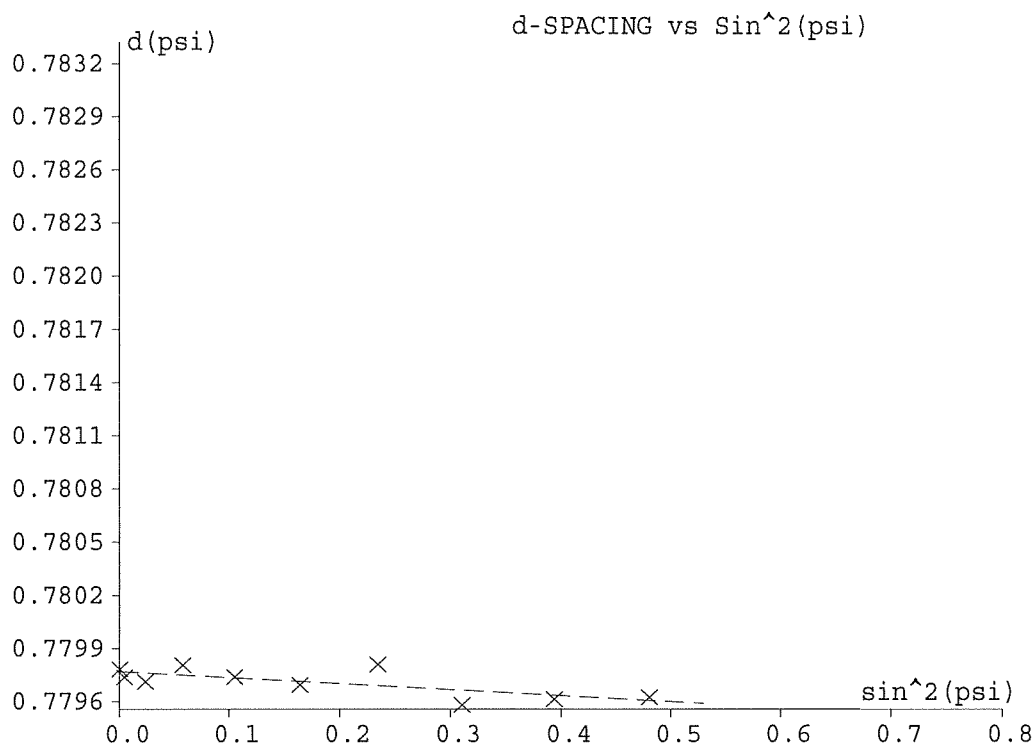
Counting Statistics Stress Error (+/-): 0.5 KSI 3.2 MPa  
Probable error.....(+/-): 1.2 KSI 8.3 MPa

File: C:\STRESS\DATA\2005\SBIR\50632\19387.STR

Sample Description:

SBIR / WP / CW Holes / AF Std. 20 / 1.5" from Hole / Baseline / Transverse / ebm

*Residual Stress.....:	-3.5 KSI	-24.0 MPa
Counting Statistics Stress Error (+/-):	0.5 KSI	3.2 MPa
Probable error.....(+/-):	1.2 KSI	8.3 MPa





===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7723.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 1 / 0.05" from Hole / Longitudinal  
Circumferential with respect to Hole / ebm

Acquisition date & time: 10/28/2005 6:47pm

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 20.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A 1.99867E-07 B -7.91049E-05 C 0.0688651 D 148.0028

Psi	Sin <sup>2</sup> (psi)	Pk Chan	Intens	FWHM	Kalp	Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00017	159.10	895.9	4.29	0.27249		161.49	0.780442	0.000062
5.0	0.00565	157.21	902.1	3.88	0.26898		161.38	0.780561	0.000043
10.0	0.02639	155.86	1148.6	3.91	0.26809		161.30	0.780649	0.000040
15.0	0.06072	158.74	1055.0	4.16	0.27141		161.47	0.780463	0.000042
20.0	0.10835	160.37	1075.9	4.17	0.27270		161.56	0.780359	0.000045
25.0	0.16675	164.37	1269.8	4.03	0.27531		161.80	0.780102	0.000036
30.0	0.23638	164.75	1305.1	4.09	0.27598		161.82	0.780079	0.000033
35.0	0.31226	168.76	1606.7	3.94	0.27893		162.05	0.779825	0.000029
40.0	0.39544	169.08	1117.6	4.08	0.27993		162.07	0.779806	0.000029
45.0	0.47911	174.62	861.2	4.06	0.28499		162.39	0.779462	0.000035

Fitted Delta D vs Sin<sup>2</sup>(psi) Data:

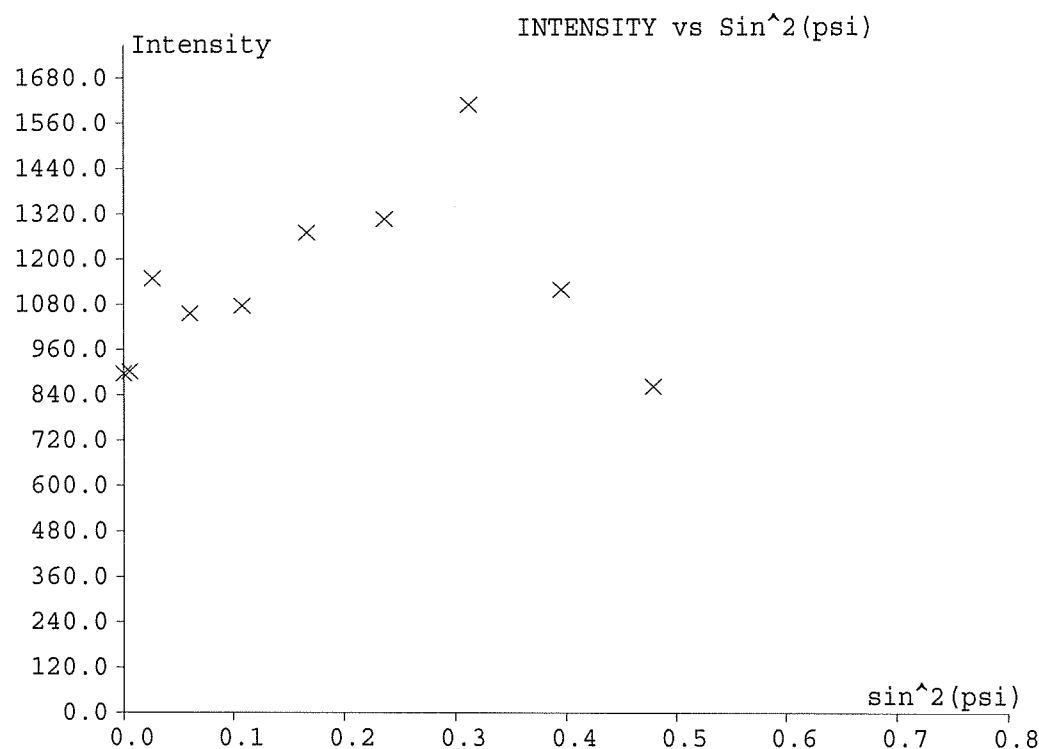
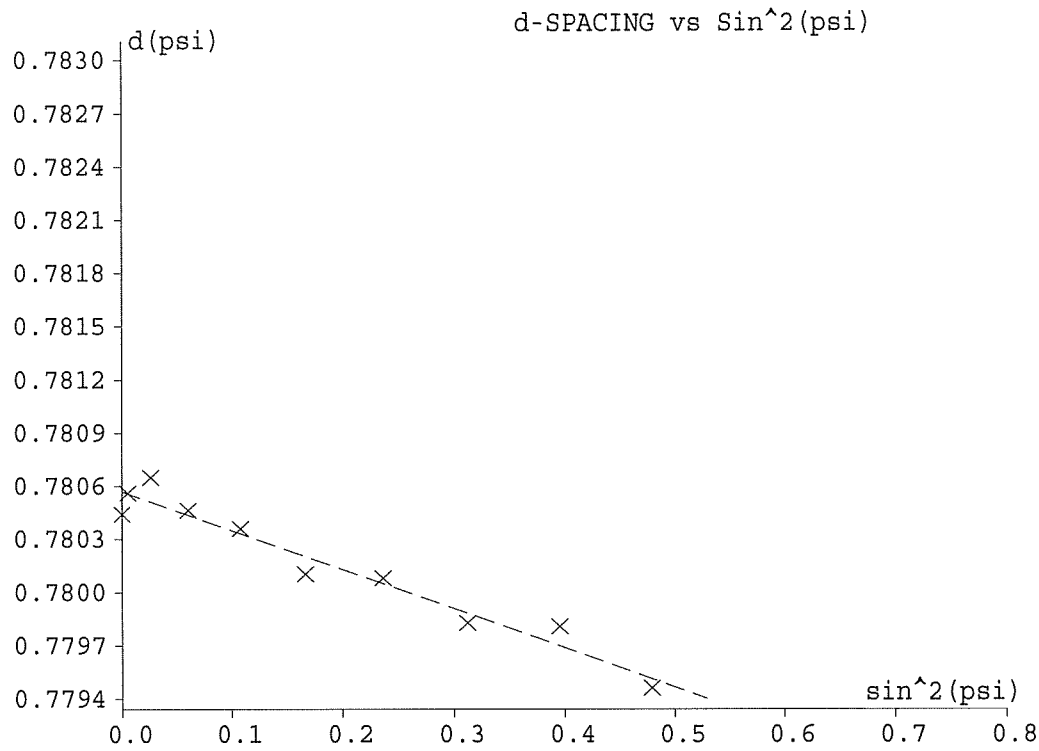
D Spacing Intercept.....: 0.780570  
Slope of Fitted Line.....: -0.002207  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -22.5 KSI -155.4 MPa

Counting Statistics Stress Error (+/-): 0.8 KSI 5.5 MPa  
Probable error.....(+/-): 1.8 KSI 12.4 MPa

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7723.STR  
Sample Description:  
SBIR / WP / CW Holes / AF Std 1 / 0.05" from Hole / Longitudinal  
Circumferential with respect to Hole / ebm

\*Residual Stress.....: -22.5 KSI -155.4 MPa  
Counting Statistics Stress Error (+/-): 0.8 KSI 5.5 MPa  
Probable error.....(+/-): 1.8 KSI 12.4 MPa



===== TEC Stress Analyzer v1.64 =====  
 ===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7724.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 1 / 0.10" from Hole / Longitudinal  
 Circumferential with respect to Hole / ebm

Acquisition date & time: 10/28/2005 6:53pm

Material [hkl].....: Al 5083-H23 [333]  
 Depth.....: 0.0000000  
 Phi angle.....: 0.00  
 Collimator.....: Round\_4mm  
 Bracket.....: 160s  
 Peak Bounding Range [percent].....: 20  
 X-ray Target Description and Wavelength: copper 1.54056  
 PSI Oscillation Angle Range.....: 2.00  
 Spectra count time (PSI=0).....: 20.0  
 High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
 ADC Channels Full Scale.....: 256  
 Detector Calibration Coefficients:  
 A 1.99867E-07 B -7.91049E-05 C 0.0688651 D 148.0028

Psi	Sin <sup>2</sup> (psi)	Pk Chan	Intens	FWHM	Kalp Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00021	161.76	1163.2	4.23	0.27418	161.64	0.780270	0.000046
5.0	0.00553	158.78	1030.7	4.11	0.27122	161.47	0.780461	0.000053
10.0	0.02582	159.39	1406.9	4.13	0.27177	161.51	0.780422	0.000042
15.0	0.06025	160.66	1138.9	3.98	0.27208	161.58	0.780339	0.000040
20.0	0.10762	162.66	1150.4	4.03	0.27385	161.70	0.780211	0.000039
25.0	0.16697	163.79	1320.6	4.05	0.27489	161.76	0.780139	0.000037
30.0	0.23609	165.42	1371.8	4.09	0.27660	161.86	0.780036	0.000030
35.0	0.31175	169.87	1780.1	4.04	0.28044	162.12	0.779756	0.000029
40.0	0.39415	171.67	1133.0	4.11	0.28251	162.22	0.779645	0.000034
45.0	0.48123	170.45	858.6	4.04	0.28098	162.15	0.779720	0.000033

Fitted Delta D vs Sin<sup>2</sup>(psi) Data:

D Spacing Intercept.....: 0.780400  
 Slope of Fitted Line.....: -0.001674  
 Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -17.1 KSI -117.9 MPa

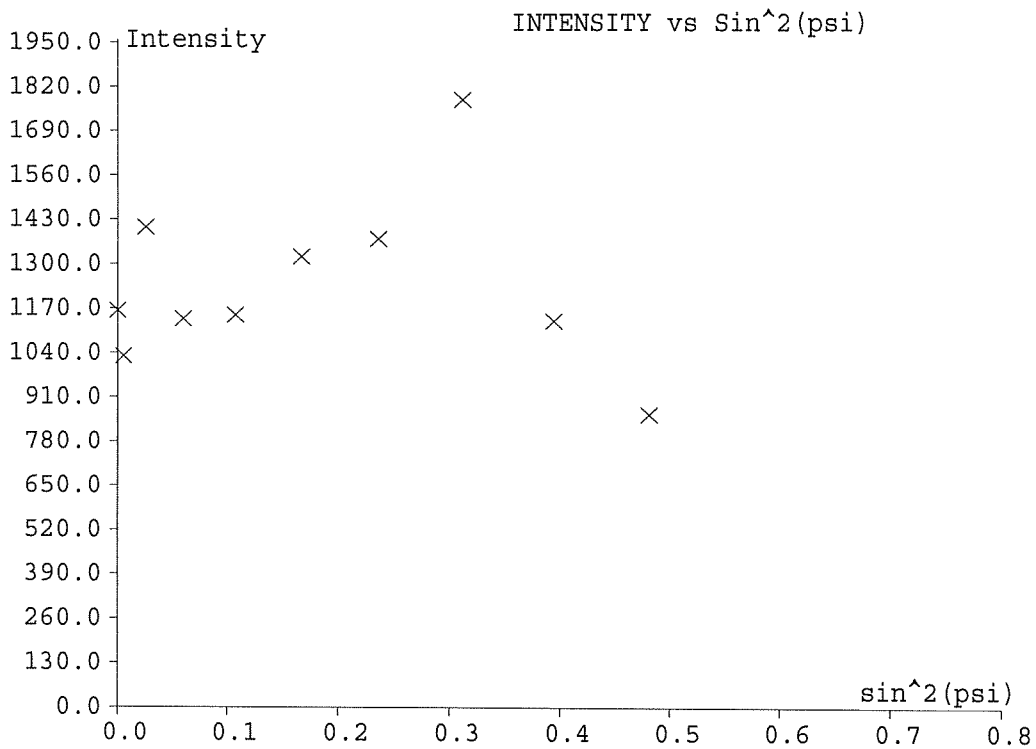
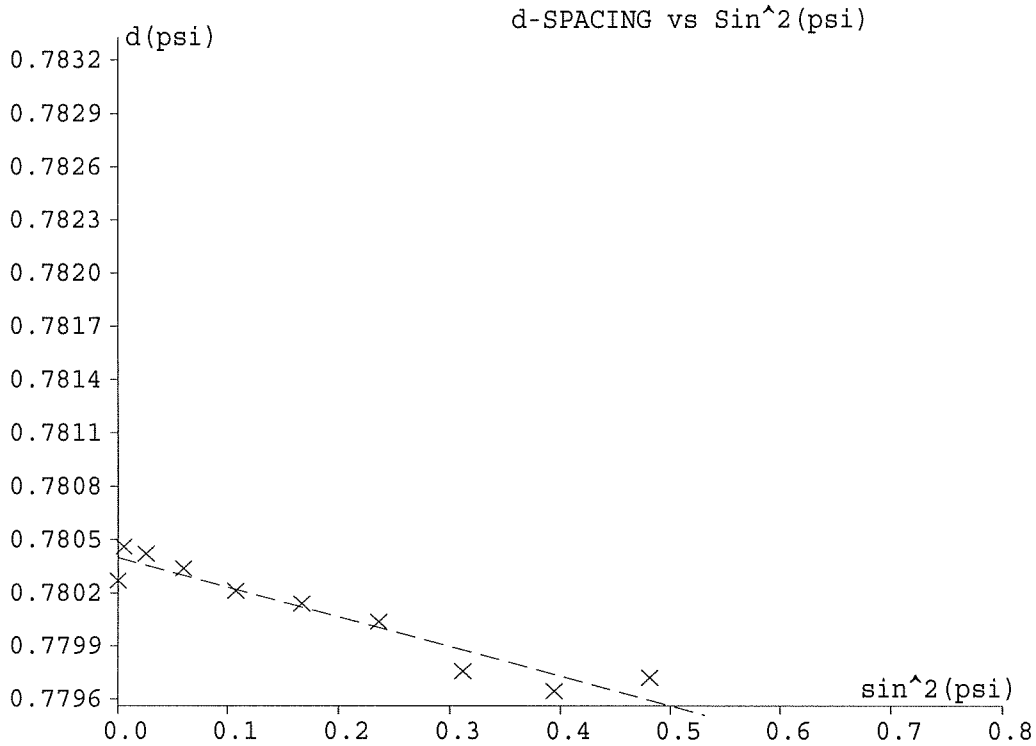
Counting Statistics Stress Error (+/-): 0.8 KSI 5.3 MPa  
 Probable error.....(+/-): 1.8 KSI 12.7 MPa

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7724.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 1 / 0.10" from Hole / Longitudinal  
Circumferential with respect to Hole / ebm

*Residual Stress.....:	-17.1 KSI	-117.9 MPa
Counting Statistics Stress Error (+/-):	0.8 KSI	5.3 MPa
Probable error.....(+/-):	1.8 KSI	12.7 MPa



===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7725.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 1 / 0.15" from Hole / Longitudinal  
Circumferential with respect to Hole / ebm

Acquisition date & time: 10/28/2005 6:58pm

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 20.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A 1.99867E-07 B -7.91049E-05 C 0.0688651 D 148.0028

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00018	159.61	1164.2	4.18	0.27216	161.52	0.780408	0.000041
5.0	0.00549	159.31	1106.5	4.51	0.27410	161.50	0.780430	0.000045
10.0	0.02569	160.19	1632.3	3.84	0.27106	161.56	0.780368	0.000036
15.0	0.06080	158.40	1138.5	3.96	0.27024	161.45	0.780485	0.000046
20.0	0.10820	160.82	1236.3	3.86	0.27160	161.59	0.780328	0.000037
25.0	0.16650	165.04	1495.7	4.07	0.27617	161.84	0.780060	0.000032
30.0	0.23619	165.19	1558.3	3.98	0.27583	161.85	0.780050	0.000027
35.0	0.31277	167.68	1810.8	3.76	0.27682	161.99	0.779892	0.000025
40.0	0.39343	173.10	1300.1	3.97	0.28311	162.31	0.779555	0.000076
45.0	0.48040	172.09	1162.9	4.09	0.28279	162.25	0.779619	0.000032

Fitted Delta D vs Sin^2(psi) Data:

D Spacing Intercept.....: 0.780465  
Slope of Fitted Line.....: -0.00193  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -19.7 KSI -135.9 MPa

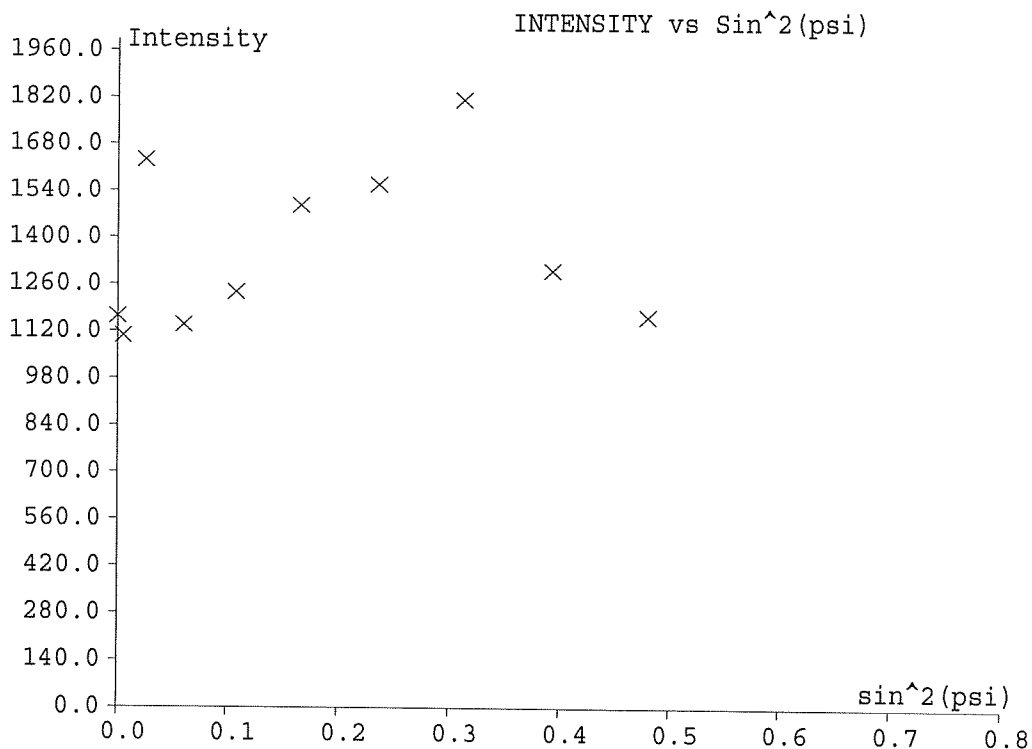
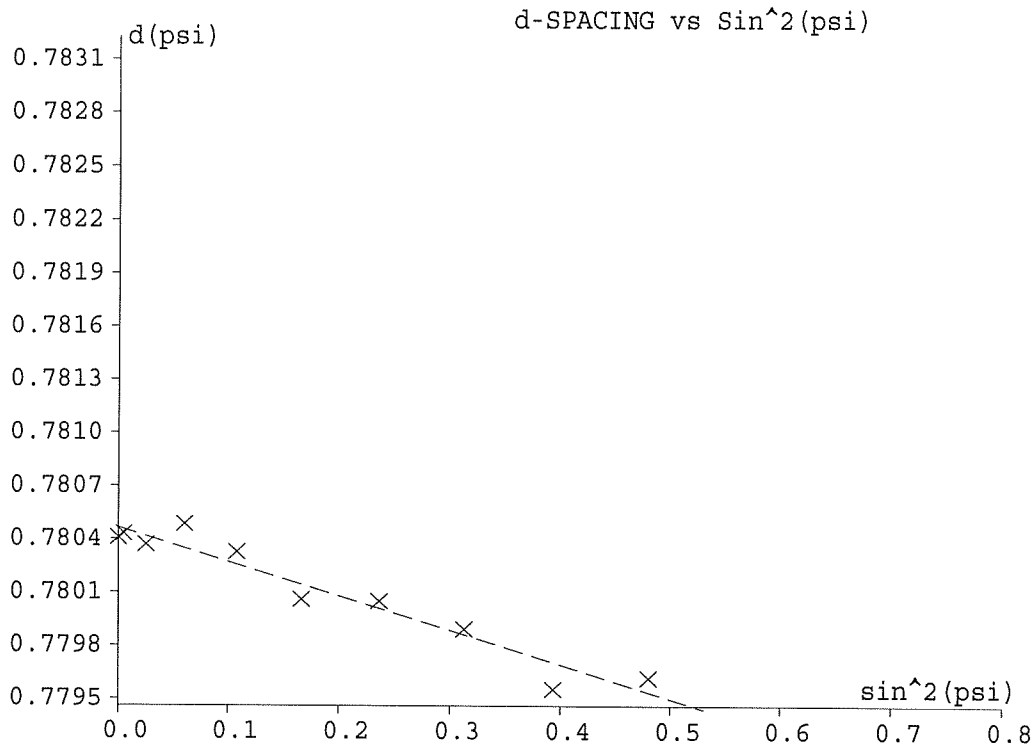
Counting Statistics Stress Error (+/-): 0.9 KSI 6.3 MPa  
Probable error.....(+/-): 1.8 KSI 12.7 MPa

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7725.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 1 / 0.15" from Hole / Longitudinal  
Circumferential with respect to Hole / ebm

*Residual Stress.....:	-19.7 KSI	-135.9 MPa
Counting Statistics Stress Error (+/-):	0.9 KSI	6.3 MPa
Probable error.....(+/-):	1.8 KSI	12.7 MPa



===== TEC Stress Analyzer v1.64 =====  
 ===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7720.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 2 / 0.05" from Hole / Longitudinal  
 Circumferential with respect to Hole / ebm

Acquisition date & time: 10/28/2005 6:26pm

Material [hkl].....: Al 5083-H23 [333]  
 Depth.....: 0.0000000  
 Phi angle.....: 0.00  
 Collimator.....: Round\_4mm  
 Bracket.....: 160s  
 Peak Bounding Range [percent].....: 20  
 X-ray Target Description and Wavelength: copper 1.54056  
 PSI Oscillation Angle Range.....: 2.00  
 Spectra count time (PSI=0).....: 20.0  
 High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
 ADC Channels Full Scale.....: 256  
 Detector Calibration Coefficients:  
 A 1.99867E-07 B -7.91049E-05 C 0.0688651 D 148.0028

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp Cor	A	2-Theta	D Spacing	St. Dev.
0.0	0.00023	163.35	1103.4	4.55	0.27760		161.73	0.780171	0.000053
5.0	0.00519	163.39	1261.6	4.04	0.27450		161.74	0.780165	0.000037
10.0	0.02501	164.47	1065.6	4.39	0.27754		161.80	0.780099	0.000064
15.0	0.05960	163.39	1069.9	4.23	0.27547		161.74	0.780166	0.000046
20.0	0.10727	163.77	905.6	3.99	0.27457		161.76	0.780140	0.000039
25.0	0.16655	164.93	997.8	4.23	0.27692		161.83	0.780068	0.000039
30.0	0.23602	165.59	1277.4	4.09	0.27677		161.87	0.780025	0.000040
35.0	0.31294	167.32	1920.4	3.96	0.27769		161.97	0.779916	0.000032
40.0	0.39464	170.66	1067.8	3.94	0.28066		162.16	0.779707	0.000028
45.0	0.48169	169.54	764.9	4.01	0.28001		162.10	0.779777	0.000074

Fitted Delta D vs Sin^2(psi) Data:

D Spacing Intercept.....: 0.780189  
 Slope of Fitted Line.....: -0.0009279  
 Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -9.5 KSI -65.3 MPa

Counting Statistics Stress Error (+/-): 1.1 KSI 7.6 MPa

Probable error.....(+/-): 1.2 KSI 8.1 MPa

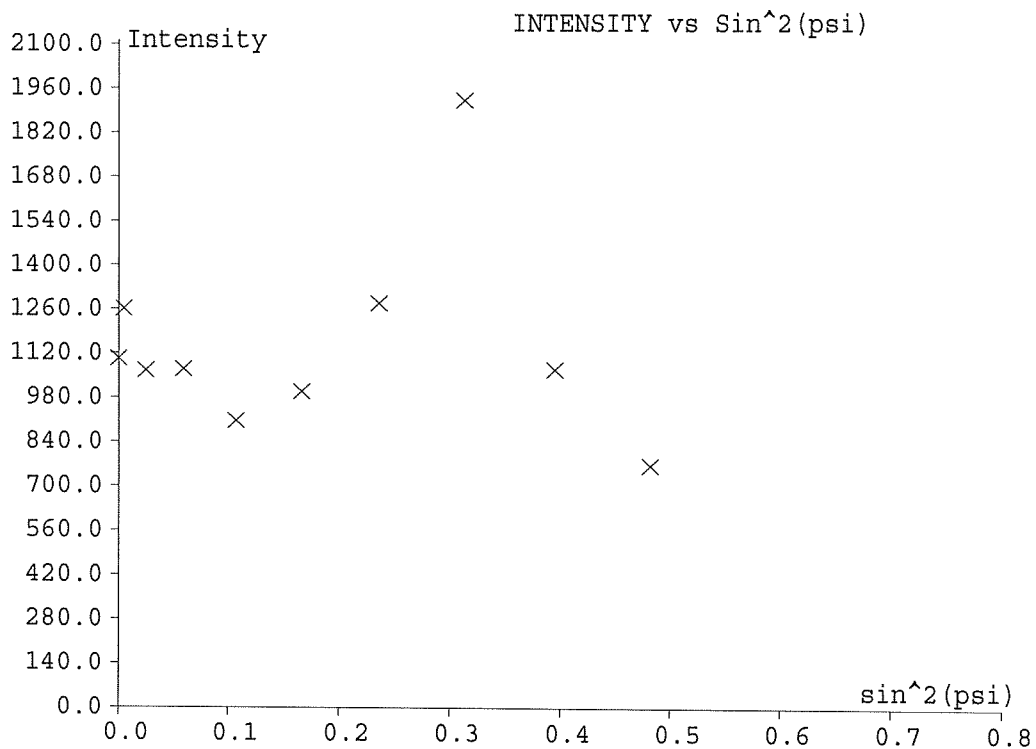
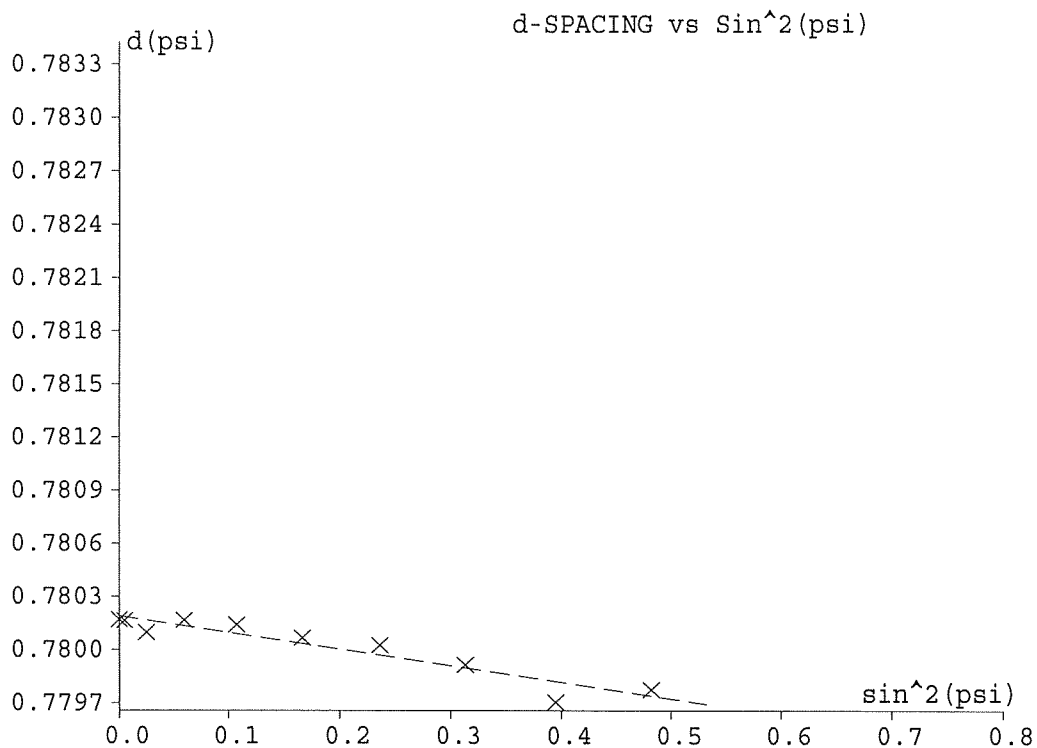
Warning: Counting statistics may be the controlling error!

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7720.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 2 / 0.05" from Hole / Longitudinal  
Circumferential with respect to Hole / ebm

*Residual Stress.....:	-9.5 KSI	-65.3 MPa
Counting Statistics Stress Error (+/-):	1.1 KSI	7.6 MPa
Probable error.....(+/-):	1.2 KSI	8.1 MPa





===== TEC Stress Analyzer v1.64 =====  
 ===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7721.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 2 / 0.10" from Hole / Longitudinal  
 Circumferential with respect to Hole / ebm

Acquisition date & time: 10/28/2005 6:33pm

Material [hkl].....: Al 5083-H23 [333]  
 Depth.....: 0.0000000  
 Phi angle.....: 0.00  
 Collimator.....: Round\_4mm  
 Bracket.....: 160s  
 Peak Bounding Range [percent].....: 20  
 X-ray Target Description and Wavelength: copper 1.54056  
 PSI Oscillation Angle Range.....: 2.00  
 Spectra count time (PSI=0).....: 20.0  
 High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
 ADC Channels Full Scale.....: 256  
 Detector Calibration Coefficients:  
 A 1.99867E-07 B -7.91049E-05 C 0.0688651 D 148.0028

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp	Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00024	163.73	1067.1	4.42	0.27706		161.76	0.780146	0.000049
5.0	0.00512	164.31	1298.4	4.14	0.27581		161.79	0.780107	0.000038
10.0	0.02460	167.04	1290.3	4.11	0.27818		161.95	0.779934	0.000042
15.0	0.05914	165.28	1392.8	4.02	0.27614		161.85	0.780045	0.000035
20.0	0.10711	164.30	1244.2	4.21	0.27618		161.79	0.780108	0.000042
25.0	0.16656	164.88	1205.3	3.91	0.27519		161.83	0.780070	0.000035
30.0	0.23520	167.48	1524.2	3.94	0.27774		161.98	0.779906	0.000031
35.0	0.31336	166.45	2048.4	3.93	0.27672		161.92	0.779971	0.000027
40.0	0.39542	169.11	1156.7	4.04	0.27976		162.07	0.779804	0.000028
45.0	0.48185	169.16	896.0	3.54	0.27642		162.08	0.779797	0.000032

Fitted Delta D vs Sin^2(psi) Data:

D Spacing Intercept.....: 0.780098  
 Slope of Fitted Line.....: -0.0006092  
 Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -6.2 KSI -42.9 MPa

Counting Statistics Stress Error (+/-): 0.7 KSI 4.8 MPa  
 Probable error.....(+/-): 1.5 KSI 10.3 MPa

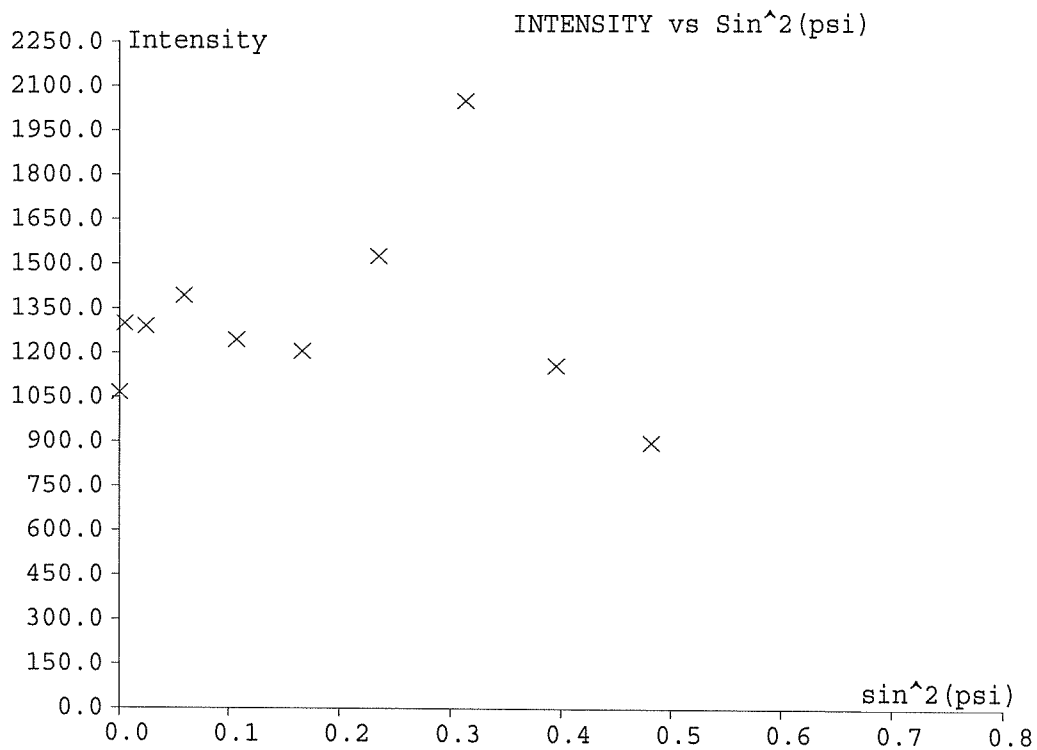
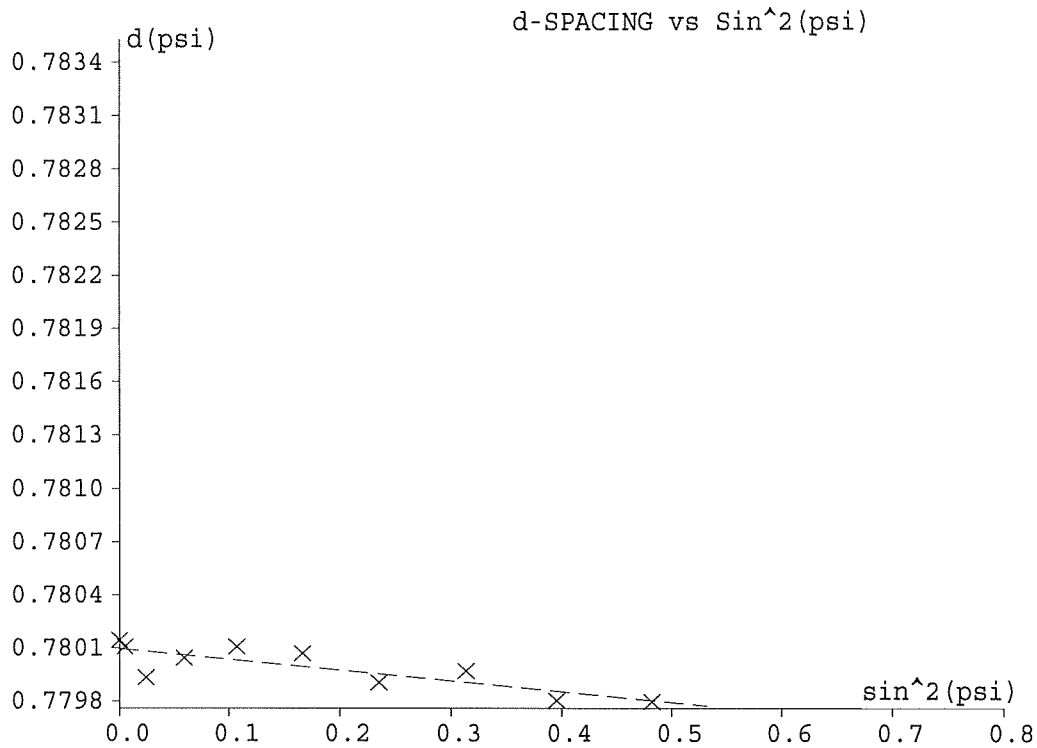
File: C:\STRESS\DATA\2143\2005\SBIR\50632\7721.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 2 / 0.10" from Hole / Longitudinal

Circumferential with respect to Hole / ebm

*Residual Stress.....:	-6.2 KSI	-42.9 MPa
Counting Statistics Stress Error (+/-):	0.7 KSI	4.8 MPa
Probable error.....(+/-):	1.5 KSI	10.3 MPa



===== TEC Stress Analyzer v1.64 =====  
 ===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7722.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 2 / 0.15" from Hole / Longitudinal  
 Circumferential with respect to Hole / ebm

Acquisition date & time: 10/28/2005 6:38pm

Material [hkl].....: Al 5083-H23 [333]  
 Depth.....: 0.0000000  
 Phi angle.....: 0.00  
 Collimator.....: Round\_4mm  
 Bracket.....: 160s  
 Peak Bounding Range [percent].....: 20  
 X-ray Target Description and Wavelength: copper 1.54056  
 PSI Oscillation Angle Range.....: 2.00  
 Spectra count time (PSI=0).....: 20.0  
 High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
 ADC Channels Full Scale.....: 256  
 Detector Calibration Coefficients:  
 A 1.99867E-07 B -7.91049E-05 C 0.0688651 D 148.0028

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp	Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00023	163.32	855.6	4.28	0.27572		161.73	0.780171	0.000046
5.0	0.00514	164.05	1054.2	4.24	0.27613		161.78	0.780124	0.000041
10.0	0.02497	164.69	1283.6	4.07	0.27581		161.82	0.780083	0.000030
15.0	0.05973	162.83	1391.1	4.18	0.27468		161.71	0.780201	0.000037
20.0	0.10680	165.24	1187.1	3.63	0.27365		161.85	0.780045	0.000034
25.0	0.16630	165.55	1399.7	3.80	0.27520		161.87	0.780027	0.000037
30.0	0.23496	168.00	1795.6	3.73	0.27683		162.01	0.779871	0.000026
35.0	0.31382	165.43	1676.3	3.64	0.27386		161.86	0.780033	0.000023
40.0	0.39661	166.71	1009.9	4.03	0.27750		161.93	0.779955	0.000036
45.0	0.48154	169.84	971.9	3.99	0.28016		162.12	0.779758	0.000028

Fitted Delta D vs Sin^2(psi) Data:

D Spacing Intercept.....: 0.780147  
 Slope of Fitted Line.....: -0.0006704  
 Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -6.8 KSI -47.2 MPa

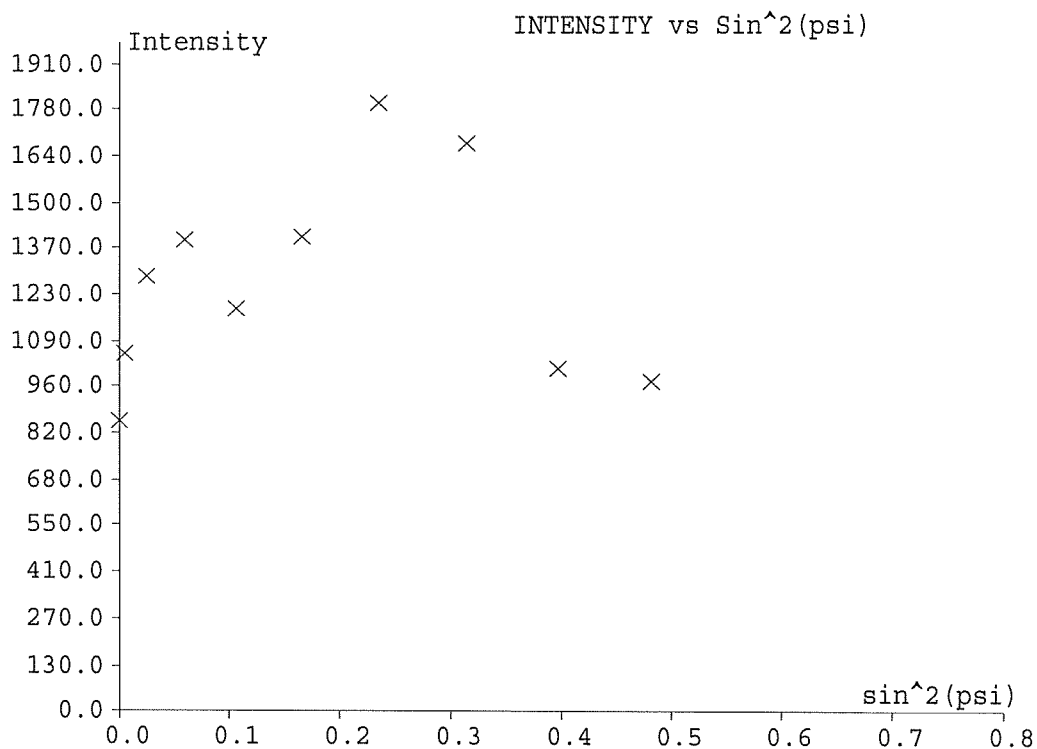
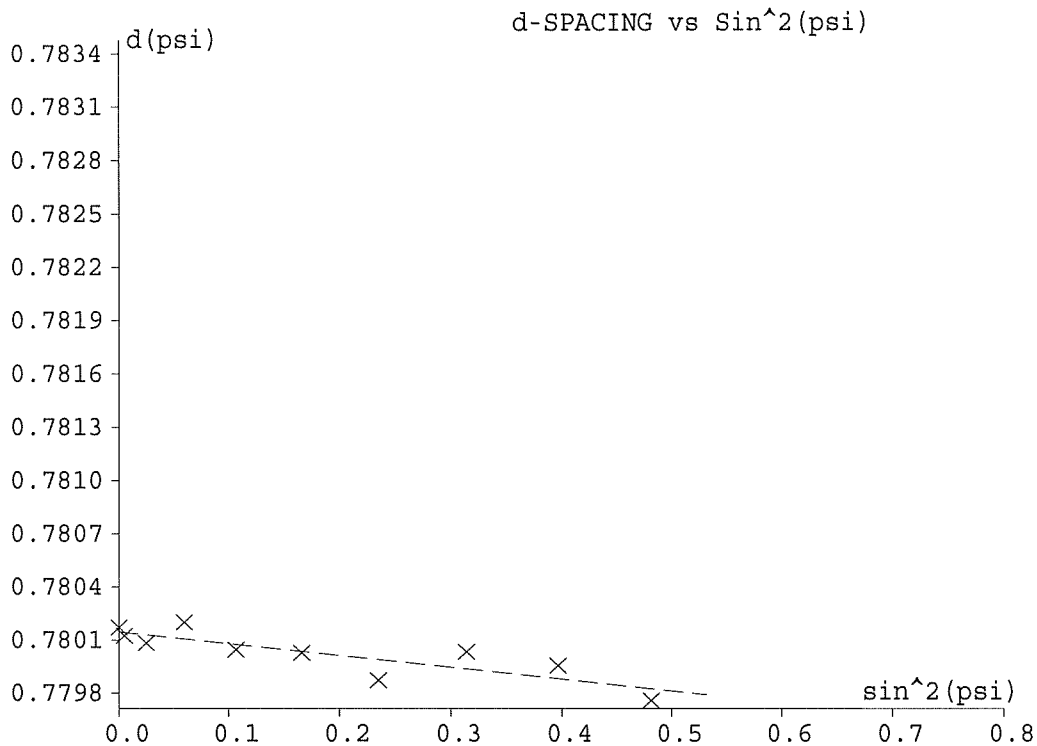
Counting Statistics Stress Error (+/-): 0.7 KSI 4.7 MPa  
 Probable error.....(+/-): 1.5 KSI 10.4 MPa

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7722.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 2 / 0.15" from Hole / Longitudinal  
Circumferential with respect to Hole / ebm

*Residual Stress.....:	-6.8 KSI	-47.2 MPa
Counting Statistics Stress Error (+/-):	0.7 KSI	4.7 MPa
Probable error.....(+/-):	1.5 KSI	10.4 MPa



===== TEC Stress Analyzer v1.64 =====  
 ===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7717.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 3 / 0.05" from Hole / Longitudinal  
 Circumferential with respect to Hole / KJR

Acquisition date & time: 10/28/2005 6:10pm

Material [hkl].....: Al 5083-H23 [333]  
 Depth.....: 0.0000000  
 Phi angle.....: 0.00  
 Collimator.....: Round\_4mm  
 Bracket.....: 160s  
 Peak Bounding Range [percent].....: 20  
 X-ray Target Description and Wavelength: copper 1.54056  
 PSI Oscillation Angle Range.....: 2.00  
 Spectra count time (PSI=0).....: 20.0  
 High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
 ADC Channels Full Scale.....: 256  
 Detector Calibration Coefficients:  
 A 1.99867E-07 B -7.91049E-05 C 0.0688651 D 148.0028

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00016	158.62	806.4	4.52	0.27366	161.46	0.780474	0.000095
5.0	0.00576	155.76	1058.6	4.21	0.26938	161.30	0.780657	0.000059
10.0	0.02571	160.07	1180.4	4.09	0.27212	161.55	0.780377	0.000043
15.0	0.06033	160.33	1393.4	3.96	0.27171	161.56	0.780360	0.000041
20.0	0.10744	163.29	1378.4	4.37	0.27634	161.73	0.780174	0.000036
25.0	0.16651	165.04	1163.0	4.29	0.27740	161.83	0.780062	0.000037
30.0	0.23616	165.27	1601.4	4.01	0.27608	161.85	0.780046	0.000030
35.0	0.31156	170.28	1470.5	4.13	0.28134	162.14	0.779731	0.000034
40.0	0.39472	170.48	1296.2	3.71	0.27893	162.16	0.779716	0.000031
45.0	0.48025	172.36	865.9	3.87	0.28183	162.26	0.779600	0.000034

Fitted Delta D vs Sin^2(psi) Data:

D Spacing Intercept.....: 0.780478  
 Slope of Fitted Line.....: -0.002004  
 Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -20.5 KSI -141.0 MPa

Counting Statistics Stress Error (+/-): 1.0 KSI 6.8 MPa

Probable error.....(+/-): 2.0 KSI 13.6 MPa

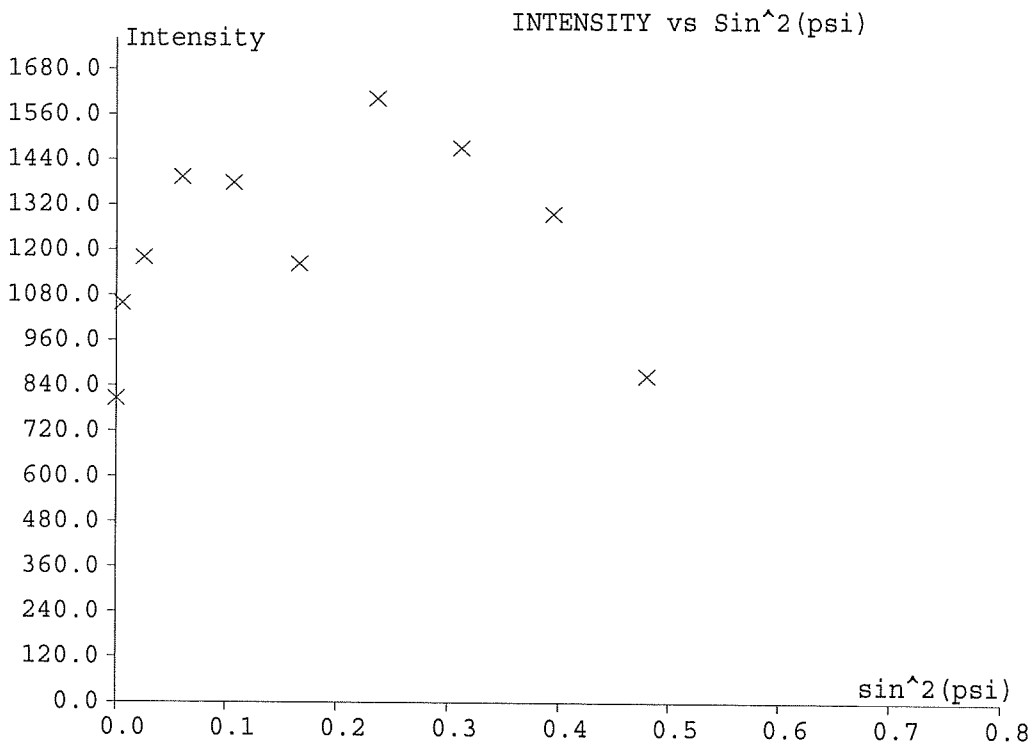
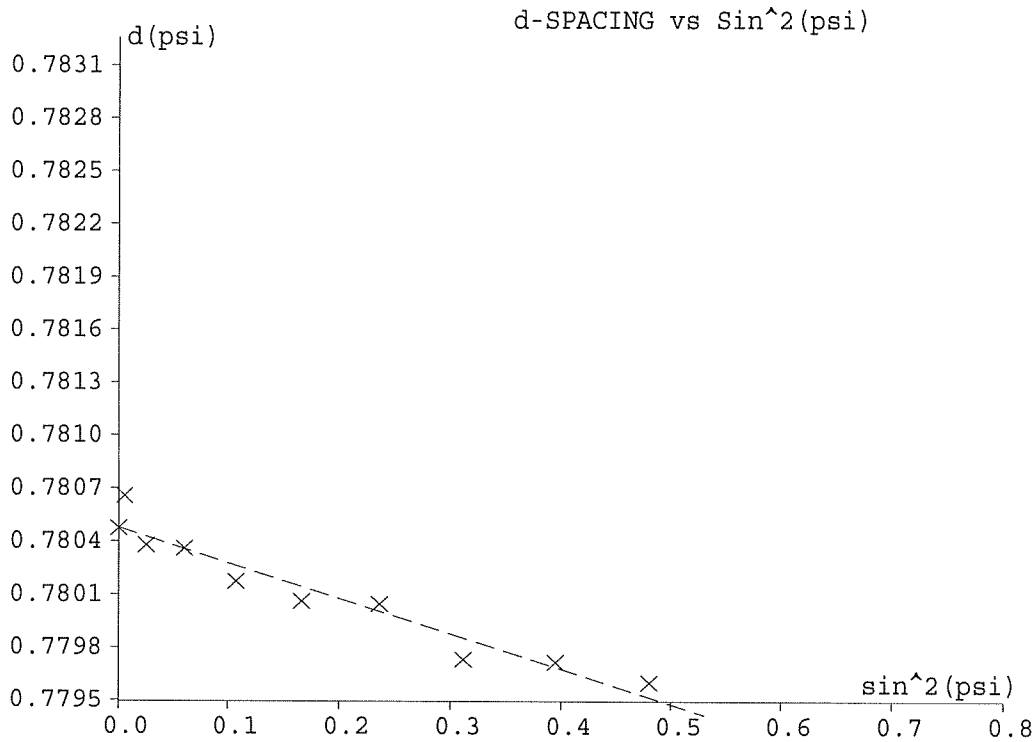
Warning: Counting statistics may be the controlling error!

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7717.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 3 / 0.05" from Hole / Longitudinal  
Circumferential with respect to Hole / KJR

*Residual Stress.....:	-20.5 KSI	-141.0 MPa
Counting Statistics Stress Error (+/-):	1.0 KSI	6.8 MPa
Probable error.....(+/-):	2.0 KSI	13.6 MPa



===== TEC Stress Analyzer v1.64 =====  
 ===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7718.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 3 / 0.10" from Hole / Longitudinal  
 Circumferential with respect to Hole / KJR

Acquisition date & time: 10/28/2005 6:15pm

Material [hkl].....: Al 5083-H23 [333]  
 Depth.....: 0.0000000  
 Phi angle.....: 0.00  
 Collimator.....: Round\_4mm  
 Bracket.....: 160s  
 Peak Bounding Range [percent].....: 20  
 X-ray Target Description and Wavelength: copper 1.54056  
 PSI Oscillation Angle Range.....: 2.00  
 Spectra count time (PSI=0).....: 20.0  
 High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
 ADC Channels Full Scale.....: 256  
 Detector Calibration Coefficients:  
 A 1.99867E-07 B -7.91049E-05 C 0.0688651 D 148.0028

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00015	157.30	972.1	4.73	0.27327	161.38	0.780560	0.000054
5.0	0.00555	158.51	1370.6	4.14	0.27113	161.46	0.780479	0.000035
10.0	0.02589	158.94	1449.7	4.10	0.27131	161.48	0.780451	0.000035
15.0	0.05964	163.22	1581.6	4.13	0.27474	161.73	0.780176	0.000034
20.0	0.10831	160.49	1424.4	4.01	0.27206	161.57	0.780350	0.000031
25.0	0.16730	162.90	1046.9	3.97	0.27373	161.71	0.780195	0.000036
30.0	0.23669	164.03	1594.8	3.95	0.27462	161.78	0.780124	0.000030
35.0	0.31188	169.57	1697.6	3.92	0.27953	162.10	0.779775	0.000026
40.0	0.39500	169.93	1297.0	3.72	0.27848	162.12	0.779751	0.000029
45.0	0.48034	172.18	869.5	3.88	0.28173	162.25	0.779612	0.000034

Fitted Delta D vs Sin^2(psi) Data:

D Spacing Intercept.....: 0.780483  
 Slope of Fitted Line.....: -0.001875  
 Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -19.1 KSI -132.0 MPa

Counting Statistics Stress Error (+/-): 0.7 KSI 4.9 MPa  
 Probable error.....(+/-): 1.9 KSI 13.1 MPa

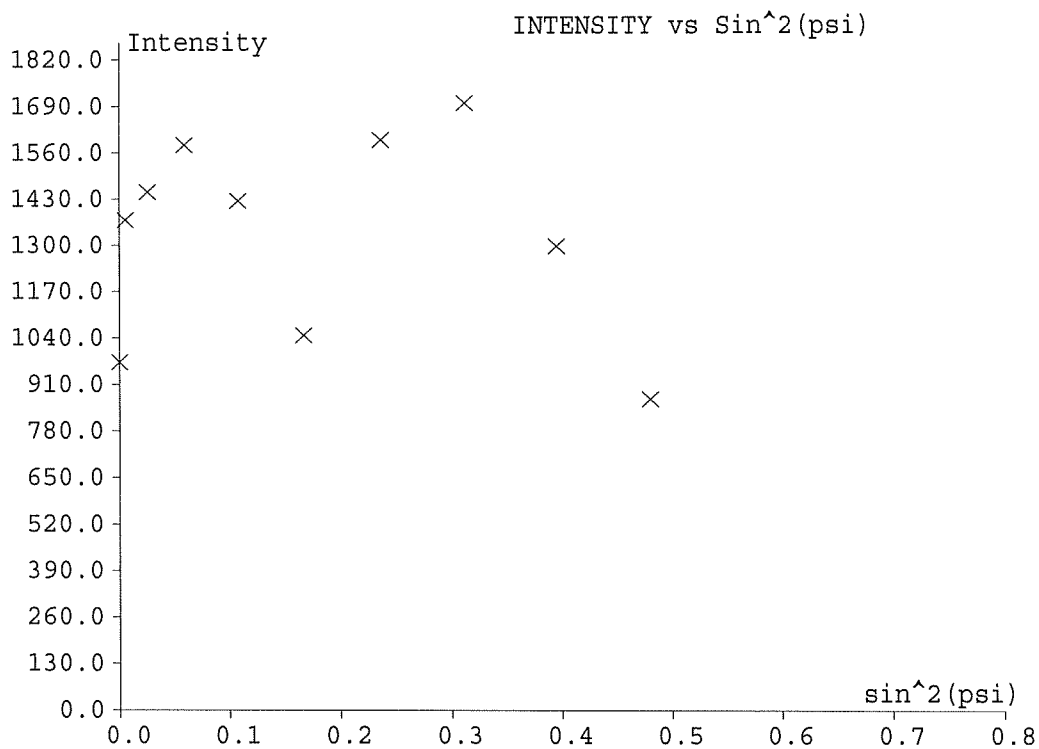
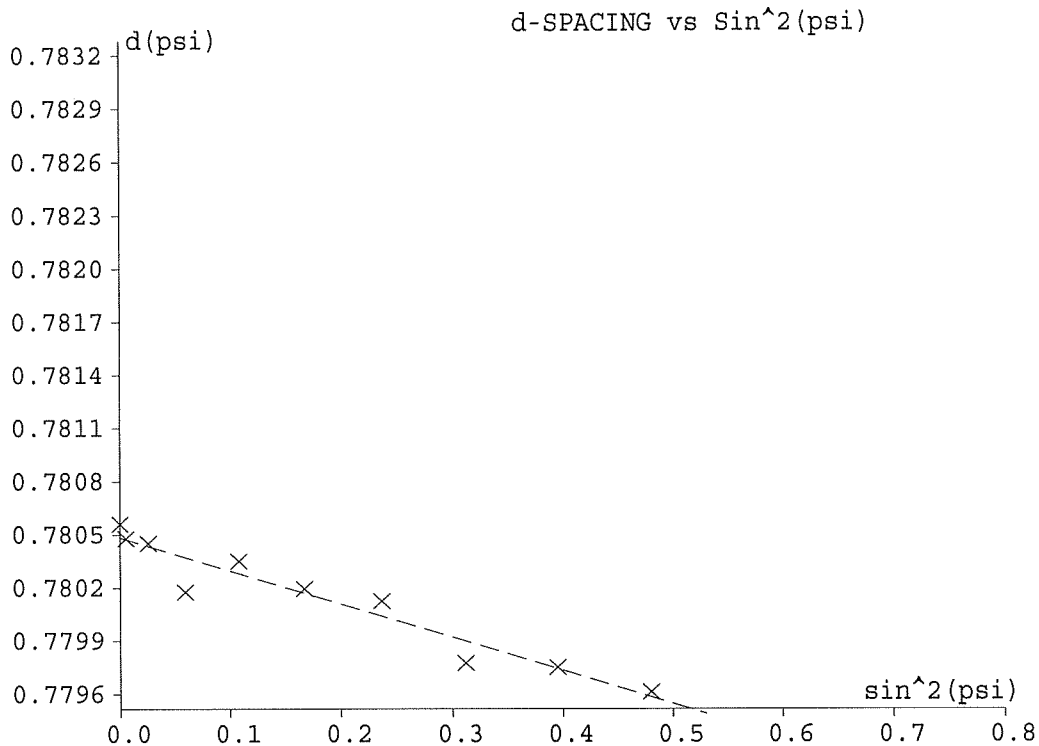
File: C:\STRESS\DATA\2143\2005\SBIR\50632\7718.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 3 / 0.10" from Hole / Longitudinal

Circumferential with respect to Hole / KJR

*Residual Stress.....:	-19.1 KSI	-132.0 MPa
Counting Statistics Stress Error (+/-):	0.7 KSI	4.9 MPa
Probable error.....(+/-):	1.9 KSI	13.1 MPa





===== TEC Stress Analyzer v1.64 =====  
 ===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7719.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 3 / 0.15" from Hole / Longitudinal  
 Circumferential with respect to Hole / ebm

Acquisition date & time: 10/28/2005 6:20pm

Material [hkl].....: Al 5083-H23 [333]  
 Depth.....: 0.0000000  
 Phi angle.....: 0.00  
 Collimator.....: Round\_4mm  
 Bracket.....: 160s  
 Peak Bounding Range [percent].....: 20  
 X-ray Target Description and Wavelength: copper 1.54056  
 PSI Oscillation Angle Range.....: 2.00  
 Spectra count time (PSI=0).....: 20.0  
 High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
 ADC Channels Full Scale.....: 256  
 Detector Calibration Coefficients:  
 A 1.99867E-07 B -7.91049E-05 C 0.0688651 D 148.0028

Psi	Sin <sup>2</sup> (psi)	Pk Chan	Intens	FWHM	Kalp Cor	A	2-Theta	D Spacing	St. Dev.
0.0	0.00018	159.93	1139.2	4.21	0.27259	161.54	0.780387	0.000042	
5.0	0.00560	157.79	1197.4	4.21	0.27098	161.41	0.780526	0.000056	
10.0	0.02600	158.27	1267.3	4.03	0.27046	161.44	0.780493	0.000036	
15.0	0.05976	162.71	1453.4	4.07	0.27405	161.70	0.780208	0.000035	
20.0	0.10742	163.32	1257.8	4.18	0.27509	161.74	0.780170	0.000034	
25.0	0.16759	162.12	1181.6	3.77	0.27200	161.67	0.780244	0.000042	
30.0	0.23630	164.91	1637.8	3.88	0.27511	161.83	0.780067	0.000030	
35.0	0.31242	168.40	1979.8	3.67	0.27676	162.03	0.779846	0.000026	
40.0	0.39341	173.13	1013.5	4.04	0.28350	162.31	0.779553	0.000035	
45.0	0.48097	170.92	937.9	3.75	0.27960	162.18	0.779689	0.000040	

Fitted Delta D vs Sin<sup>2</sup>(psi) Data:

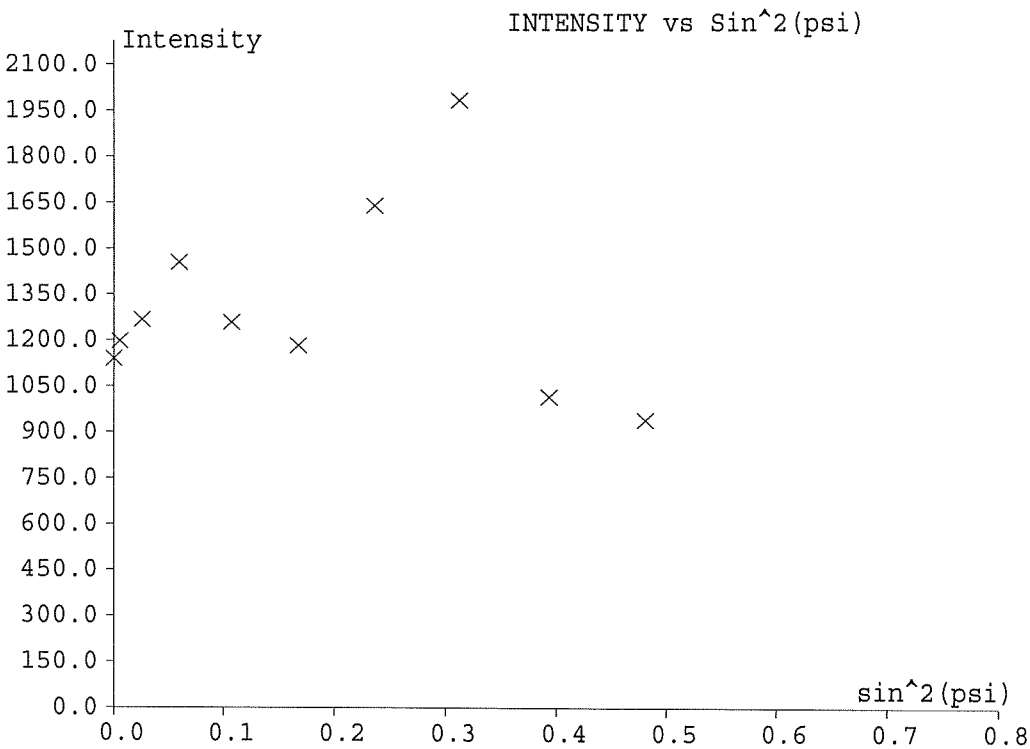
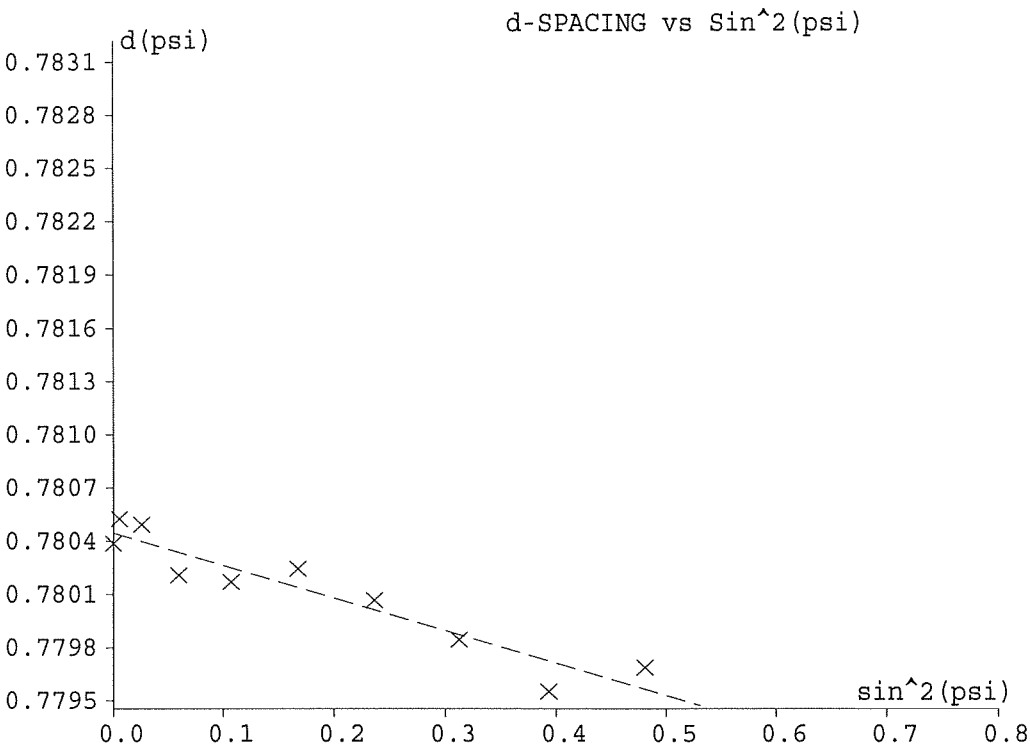
D Spacing Intercept.....: 0.780446  
 Slope of Fitted Line.....: -0.001832  
 Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -18.7 KSI -128.9 MPa

Counting Statistics Stress Error (+/-): 0.8 KSI 5.5 MPa  
 Probable error.....(+/-): 2.3 KSI 15.6 MPa

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7719.STR  
Sample Description:  
SBIR / WP / CW Holes / AF Std 3 / 0.15" from Hole / Longitudinal  
Circumferential with respect to Hole / ebm

\*Residual Stress.....: -18.7 KSI -128.9 MPa  
Counting Statistics Stress Error (+/-): 0.8 KSI 5.5 MPa  
Probable error.....(+/-): 2.3 KSI 15.6 MPa



===== TEC Stress Analyzer v1.64 =====  
 ===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7714.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 4 / 0.05" from Hole / Longitudinal  
 Circumferential with respect to Hole / KJR

Acquisition date & time: 10/28/2005 5:50pm

Material [hkl].....: Al 5083-H23 [333]  
 Depth.....: 0.0000000  
 Phi angle.....: 0.00  
 Collimator.....: Round\_4mm  
 Bracket.....: 160s  
 Peak Bounding Range [percent].....: 20  
 X-ray Target Description and Wavelength: copper 1.54056  
 PSI Oscillation Angle Range.....: 2.00  
 Spectra count time (PSI=0).....: 20.0  
 High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
 ADC Channels Full Scale.....: 256  
 Detector Calibration Coefficients:  
 A 1.99867E-07 B -7.91049E-05 C 0.0688651 D 148.0028

Psi	Sin <sup>2</sup> (psi)	Pk Chan	Intens	FWHM	Kalp Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00020	161.48	753.6	4.20	0.27377	161.63	0.780287	0.000057
5.0	0.00558	158.17	752.3	4.55	0.27346	161.43	0.780503	0.000052
10.0	0.02607	157.80	1333.1	3.99	0.26994	161.42	0.780523	0.000037
15.0	0.06015	161.11	1135.2	4.15	0.27320	161.61	0.780311	0.000050
20.0	0.10744	163.26	961.1	4.12	0.27472	161.73	0.780173	0.000037
25.0	0.16631	165.53	1037.1	4.07	0.27658	161.86	0.780029	0.000039
30.0	0.23630	164.92	1317.9	4.01	0.27576	161.83	0.780067	0.000030
35.0	0.31308	167.02	1679.3	3.79	0.27642	161.95	0.779933	0.000026
40.0	0.39422	171.53	1158.6	4.19	0.28283	162.21	0.779654	0.000031
45.0	0.48094	170.98	1049.2	3.67	0.27901	162.18	0.779685	0.000034

Fitted Delta D vs Sin<sup>2</sup>(psi) Data:

D Spacing Intercept.....: 0.780418  
 Slope of Fitted Line.....: -0.001682  
 Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -17.2 KSI -118.4 MPa

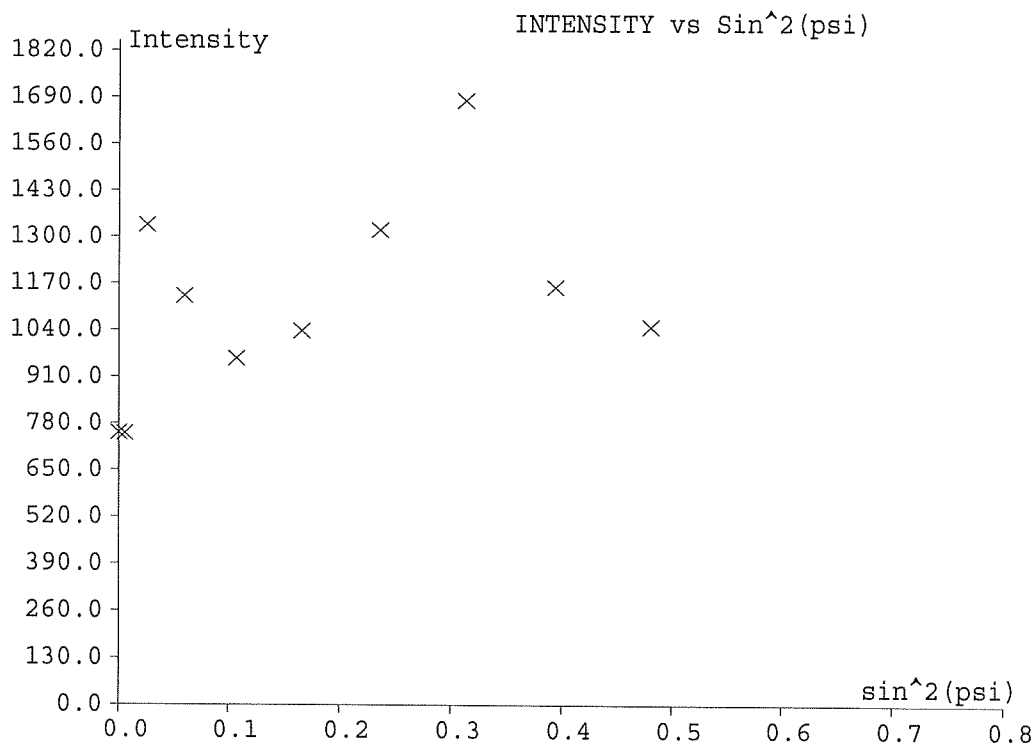
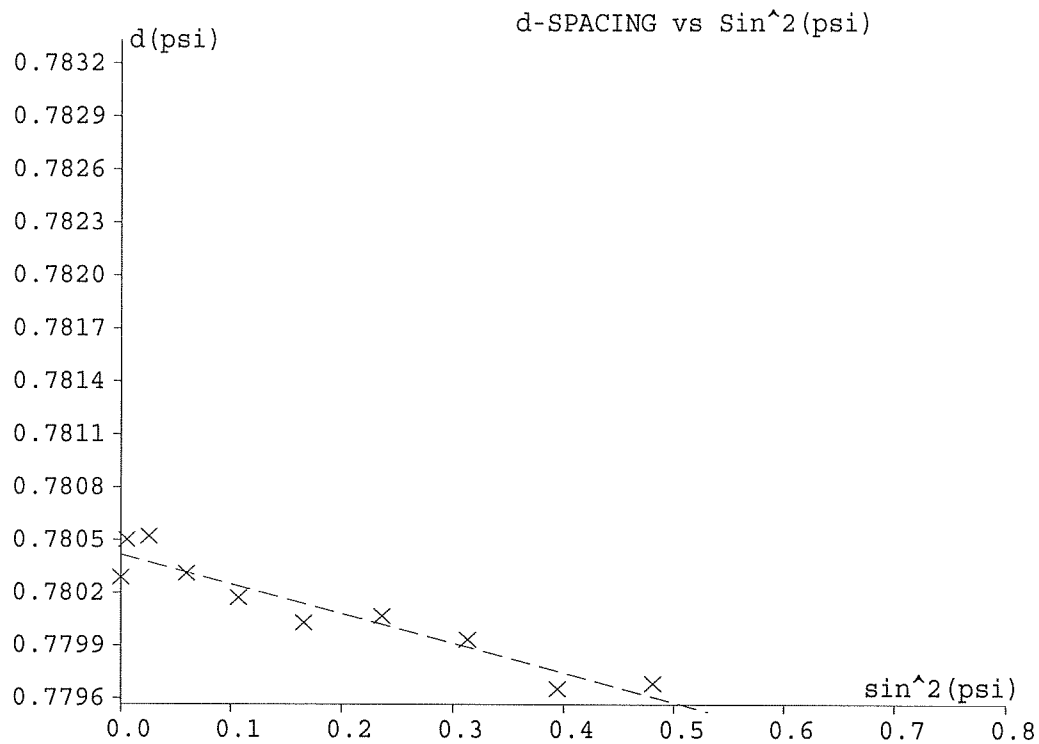
Counting Statistics Stress Error (+/-): 0.8 KSI 5.5 MPa  
 Probable error.....(+/-): 2.0 KSI 14.1 MPa

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7714.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 4 / 0.05" from Hole / Longitudinal  
Circumferential with respect to Hole / KJR

*Residual Stress.....:	-17.2 KSI	-118.4 MPa
Counting Statistics Stress Error (+/-):	0.8 KSI	5.5 MPa
Probable error.....(+/-):	2.0 KSI	14.1 MPa



===== TEC Stress Analyzer v1.64 =====  
 ===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7715.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 4 / 0.10" from Hole / Longitudinal  
 Circumferential with respect to Hole / KJR

Acquisition date & time: 10/28/2005 5:55pm

Material [hkl].....: Al 5083-H23 [333]  
 Depth.....: 0.0000000  
 Phi angle.....: 0.00  
 Collimator.....: Round\_4mm  
 Bracket.....: 160s  
 Peak Bounding Range [percent].....: 20  
 X-ray Target Description and Wavelength: copper 1.54056  
 PSI Oscillation Angle Range.....: 2.00  
 Spectra count time (PSI=0).....: 20.0  
 High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
 ADC Channels Full Scale.....: 256  
 Detector Calibration Coefficients:  
 A 1.99867E-07 B -7.91049E-05 C 0.0688651 D 148.0028

Psi	Sin <sup>2</sup> (psi)	Pk Chan	Intens	FWHM	Kalp Cor	A	2-Theta	D Spacing	St. Dev.
0.0	0.00020	161.16	1063.8	4.51	0.27557		161.61	0.780310	0.000060
5.0	0.00558	158.13	1018.7	3.96	0.27005		161.43	0.780502	0.000051
10.0	0.02603	158.04	1350.4	3.97	0.27002		161.43	0.780508	0.000038
15.0	0.06017	161.01	1351.4	4.02	0.27249		161.60	0.780317	0.000037
20.0	0.10700	164.63	1496.4	3.88	0.27485		161.81	0.780086	0.000038
25.0	0.16611	166.07	1503.7	4.09	0.27722		161.90	0.779995	0.000035
30.0	0.23659	164.26	1536.2	3.90	0.27462		161.79	0.780109	0.000028
35.0	0.31338	166.35	1696.2	3.53	0.27386		161.92	0.779974	0.000021
40.0	0.39457	170.83	1045.4	4.32	0.28291		162.17	0.779698	0.000040
45.0	0.48063	171.58	1159.7	3.68	0.27968		162.22	0.779647	0.000029

Fitted Delta D vs Sin<sup>2</sup>(psi) Data:

D Spacing Intercept.....: 0.780408  
 Slope of Fitted Line.....: -0.001642  
 Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -16.8 KSI -115.6 MPa

Counting Statistics Stress Error (+/-): 0.8 KSI 5.4 MPa  
 Probable error..... (+/-): 2.2 KSI 15.4 MPa

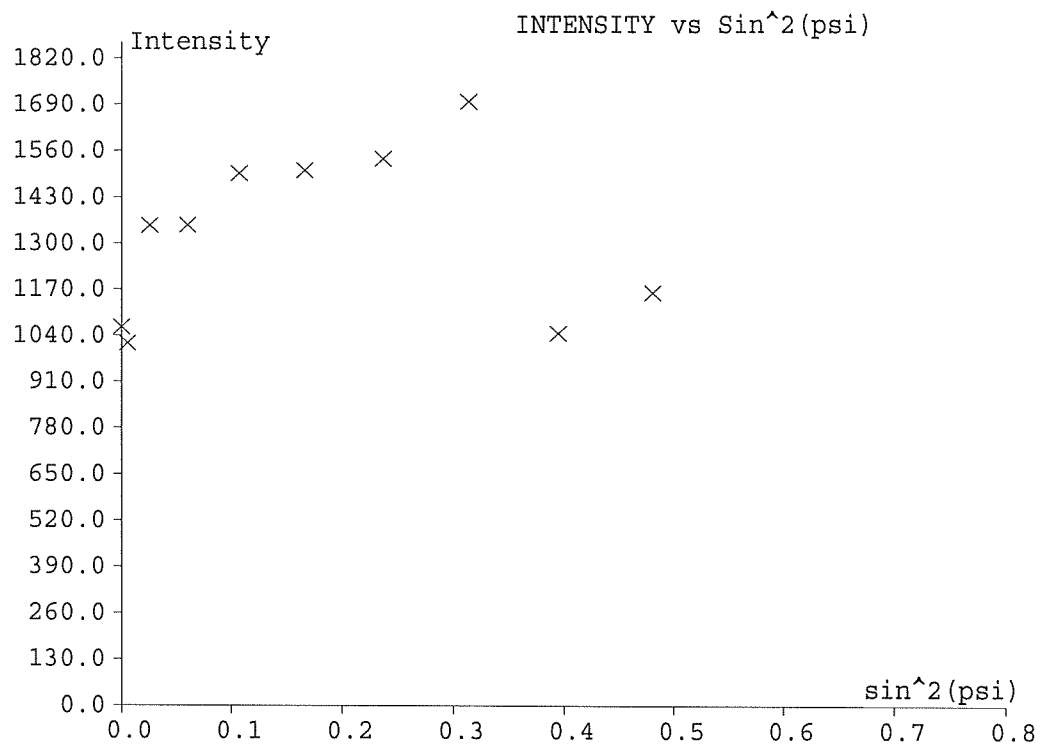
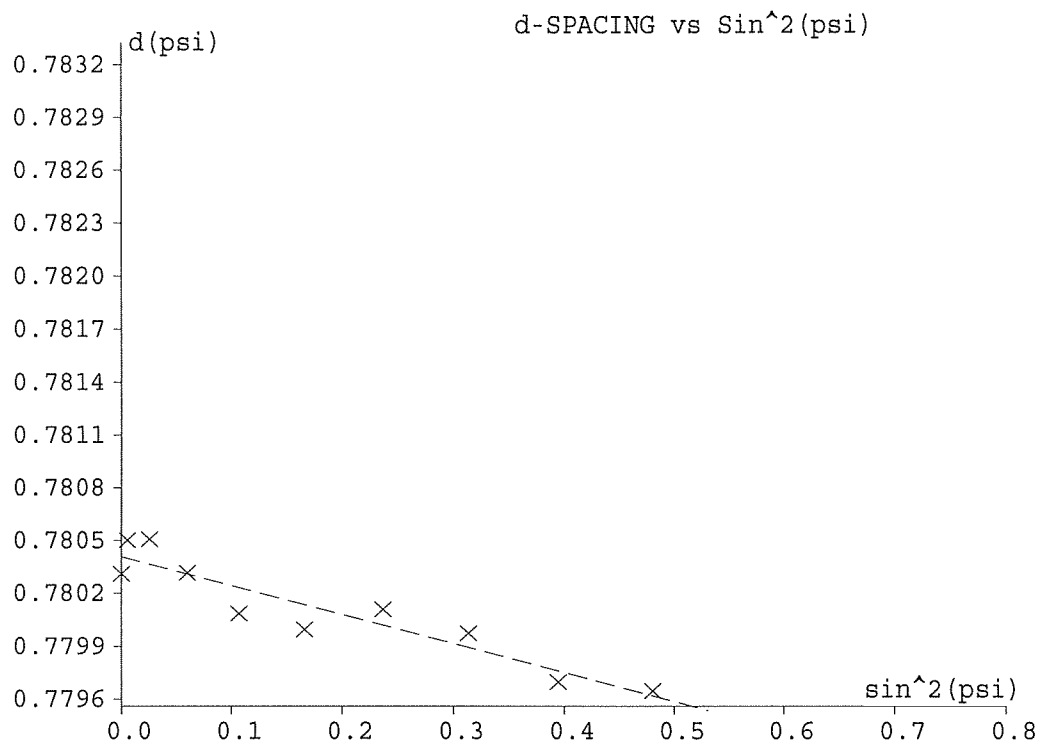
File: C:\STRESS\DATA\2143\2005\SBIR\50632\7715.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 4 / 0.10" from Hole / Longitudinal

Circumferential with respect to Hole / KJR

*Residual Stress.....:	-16.8 KSI	-115.6 MPa
Counting Statistics Stress Error (+/-):	0.8 KSI	5.4 MPa
Probable error.....(+/-):	2.2 KSI	15.4 MPa



===== TEC Stress Analyzer v1.64 =====  
 ===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7716.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 4 / 0.15" from Hole / Longitudinal  
 Circumferential with respect to Hole / KJR

Acquisition date & time: 10/28/2005 6:01pm

Material [hkl].....: Al 5083-H23 [333]  
 Depth.....: 0.0000000  
 Phi angle.....: 0.00  
 Collimator.....: Round\_4mm  
 Bracket.....: 160s  
 Peak Bounding Range [percent].....: 20  
 X-ray Target Description and Wavelength: copper 1.54056  
 PSI Oscillation Angle Range.....: 2.00  
 Spectra count time (PSI=0).....: 20.0  
 High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
 ADC Channels Full Scale.....: 256  
 Detector Calibration Coefficients:  
 A 1.99867E-07 B -7.91049E-05 C 0.0688651 D 148.0028

Psi	Sin <sup>2</sup> (psi)	Pk Chan	Intens	FWHM	Kalp Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00020	161.22	1104.8	4.19	0.27350	161.61	0.780304	0.000049
5.0	0.00558	158.00	1263.4	3.73	0.26853	161.43	0.780509	0.000041
10.0	0.02586	159.11	1367.4	4.15	0.27165	161.49	0.780440	0.000046
15.0	0.05992	162.03	1165.8	4.02	0.27329	161.66	0.780251	0.000039
20.0	0.10695	164.79	1364.8	3.89	0.27504	161.82	0.780075	0.000032
25.0	0.16646	165.16	1395.3	4.14	0.27660	161.84	0.780053	0.000045
30.0	0.23689	163.56	1823.7	3.91	0.27400	161.75	0.780153	0.000033
35.0	0.31282	167.57	1789.5	3.77	0.27677	161.98	0.779899	0.000023
40.0	0.39206	175.86	1034.1	4.09	0.28631	162.47	0.779386	0.000053
45.0	0.48082	171.23	905.1	3.86	0.28074	162.20	0.779671	0.000029

Fitted Delta D vs Sin<sup>2</sup>(psi) Data:

D Spacing Intercept.....: 0.780401  
 Slope of Fitted Line.....: -0.00183  
 Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -18.7 KSI -128.8 MPa

Counting Statistics Stress Error (+/-): 0.8 KSI 5.5 MPa  
 Probable error.....(+/-): 3.2 KSI 21.8 MPa

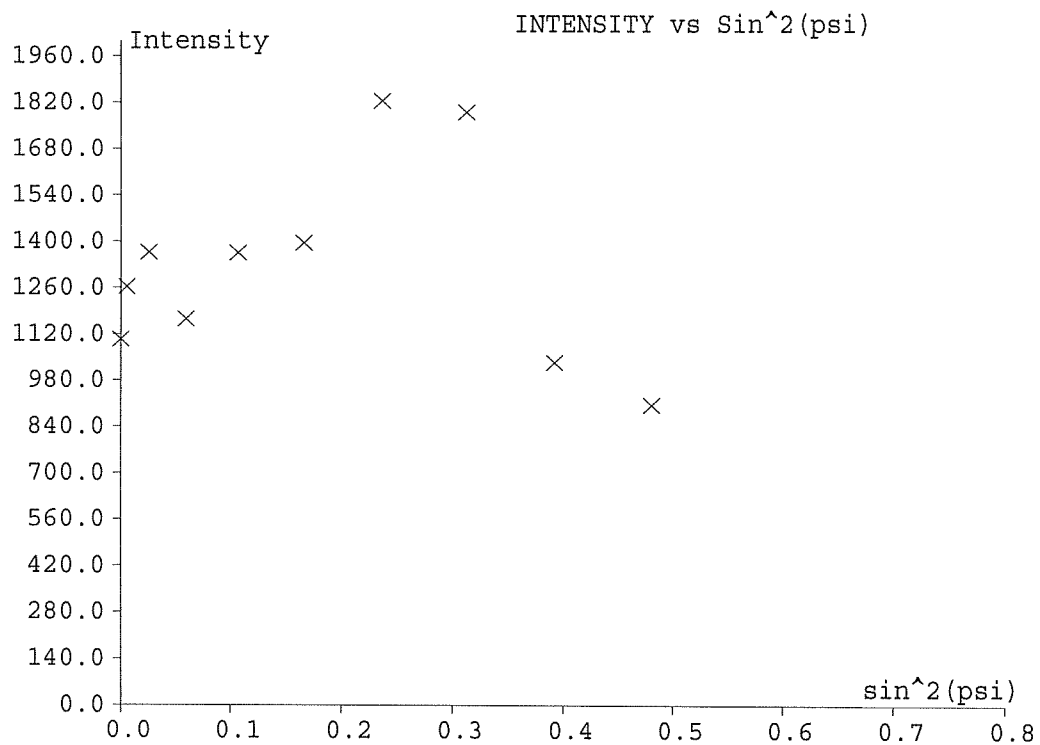
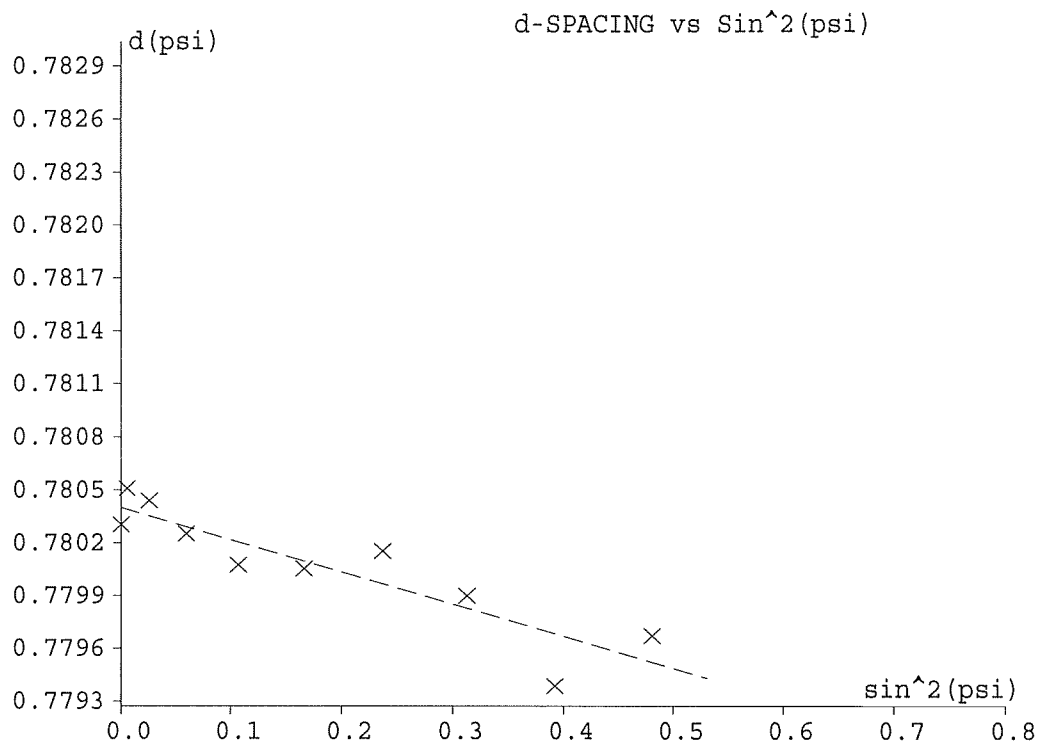
File: C:\STRESS\DATA\2143\2005\SBIR\50632\7716.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 4 / 0.15" from Hole / Longitudinal

Circumferential with respect to Hole / KJR

*Residual Stress.....:	-18.7 KSI	-128.8 MPa
Counting Statistics Stress Error (+/-):	0.8 KSI	5.5 MPa
Probable error.....(+/-):	3.2 KSI	21.8 MPa





===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7711.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 5 / 0.05" from Hole / Longitudinal  
Circumferential with respect to Hole / KJR

Acquisition date & time: 10/28/2005 5:20pm

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 20.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A 1.99867E-07 B -7.91049E-05 C 0.0688651 D 148.0028

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp Cor	A 2-Theta	D Spacing	St. Dev.
0.0	0.00027	165.62	958.9	4.32	0.27809	161.87	0.780025	0.000065
5.0	0.00520	163.17	1180.4	3.84	0.27329	161.73	0.780178	0.000031
10.0	0.02499	164.54	1302.1	3.87	0.27471	161.81	0.780091	0.000040
15.0	0.05897	166.05	1105.5	4.61	0.28025	161.89	0.780000	0.000062
20.0	0.10707	164.42	1066.2	4.07	0.27558	161.80	0.780100	0.000046
25.0	0.16667	164.59	1409.4	4.01	0.27546	161.81	0.780089	0.000027
30.0	0.23572	166.28	1568.9	4.03	0.27710	161.91	0.779982	0.000030
35.0	0.31342	166.32	1698.1	3.94	0.27666	161.91	0.779979	0.000026
40.0	0.39603	167.89	942.9	4.01	0.27846	162.00	0.779880	0.000030
45.0	0.48249	167.93	852.1	3.64	0.27612	162.01	0.779875	0.000029

Fitted Delta D vs Sin^2(psi) Data:

D Spacing Intercept.....: 0.780104  
Slope of Fitted Line.....: -0.0004717  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -4.8 KSI -33.2 MPa

Counting Statistics Stress Error (+/-): 0.8 KSI 5.3 MPa  
Probable error.....(+/-): 1.1 KSI 7.8 MPa

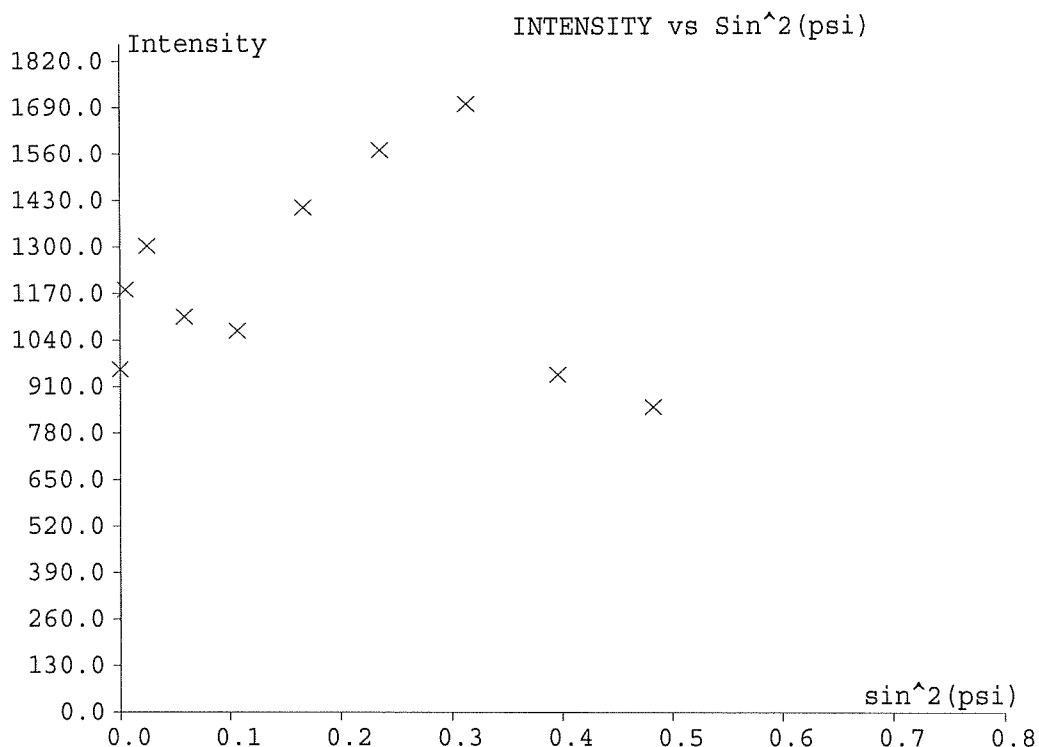
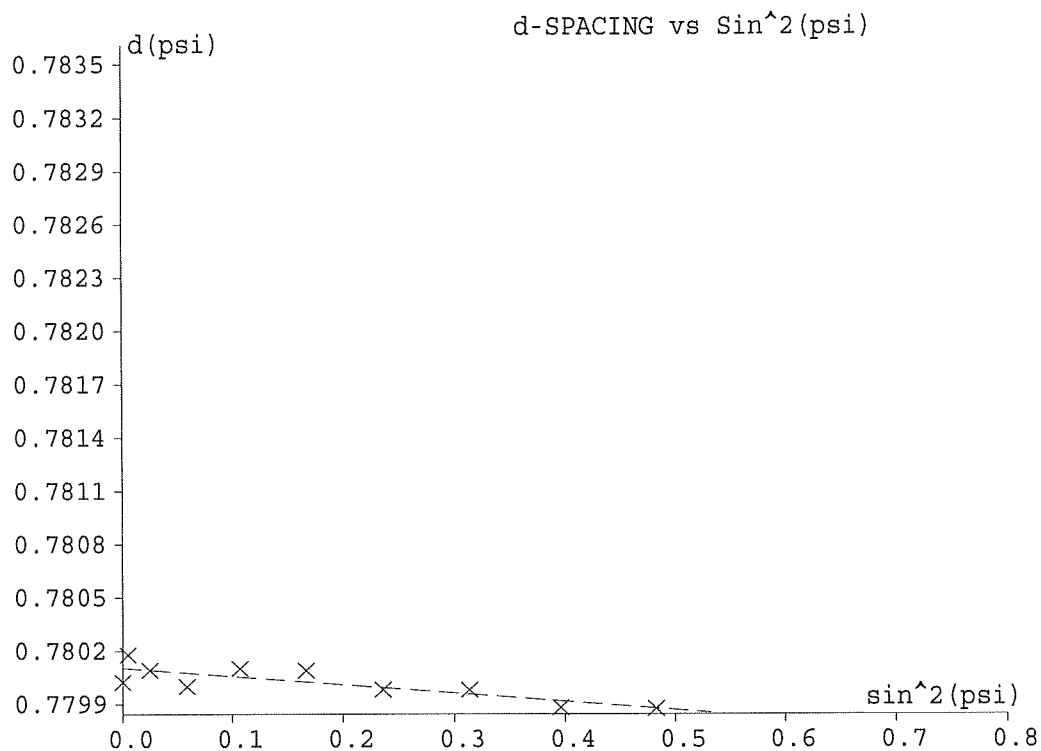
Warning: Counting statistics may be the controlling error!

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7711.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 5 / 0.05" from Hole / Longitudinal  
Circumferential with respect to Hole / KJR

*Residual Stress.....:	-4.8 KSI	-33.2 MPa
Counting Statistics Stress Error (+/-):	0.8 KSI	5.3 MPa
Probable error.....(+/-):	1.1 KSI	7.8 MPa



===== TEC Stress Analyzer v1.64 =====  
 ===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7712.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 5 / 0.10" from Hole / Longitudinal

Circumferential with respect to Hole / KJR

Acquisition date & time: 10/28/2005 5:33pm

Material [hkl].....: Al 5083-H23 [333]

Depth.....: 0.0000000

Phi angle.....: 0.00

Collimator.....: Round\_4mm

Bracket.....: 160s

Peak Bounding Range [percent].....: 20

X-ray Target Description and Wavelength: copper 1.54056

PSI Oscillation Angle Range.....: 2.00

Spectra count time (PSI=0).....: 20.0

High Voltage(kV) and Beam Current(mA)...: 45.00 1.50

ADC Channels Full Scale.....: 256

Detector Calibration Coefficients:

A 1.99867E-07 B -7.91049E-05 C 0.0688651 D 148.0028

Psi	Sin <sup>2</sup> (psi)	Pk Chan	Intens	FWHM	Kalp	Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00027	165.64	1006.4	4.37	0.27848		161.87	0.780024	0.000054
5.0	0.00505	165.26	1089.7	3.93	0.27567		161.85	0.780046	0.000045
10.0	0.02503	164.31	1428.3	3.66	0.27305		161.80	0.780104	0.000031
15.0	0.05892	166.22	1369.2	4.12	0.27750		161.90	0.779986	0.000039
20.0	0.10727	163.82	1155.6	4.27	0.27614		161.76	0.780139	0.000049
25.0	0.16676	164.35	1441.3	4.11	0.27572		161.80	0.780104	0.000031
30.0	0.23552	166.73	1759.4	3.81	0.27634		161.94	0.779952	0.000028
35.0	0.31418	164.69	1619.7	3.76	0.27410		161.82	0.780081	0.000024
40.0	0.39607	167.78	1172.8	3.80	0.27721		162.00	0.779886	0.000026
45.0	0.48297	167.02	1050.4	3.91	0.27717		161.95	0.779935	0.000031

Fitted Delta D vs Sin<sup>2</sup>(psi) Data:

D Spacing Intercept.....: 0.780076

Slope of Fitted Line.....: -0.0002788

Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -2.8 KSI -19.6 MPa

Counting Statistics Stress Error (+/-): 0.7 KSI 4.9 MPa

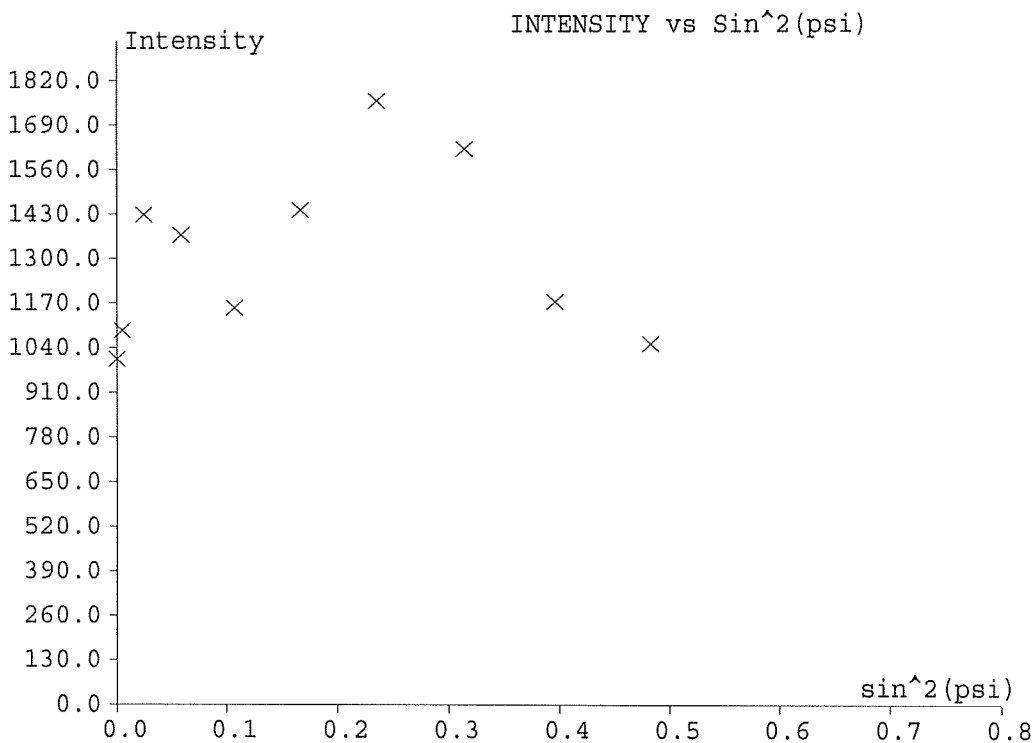
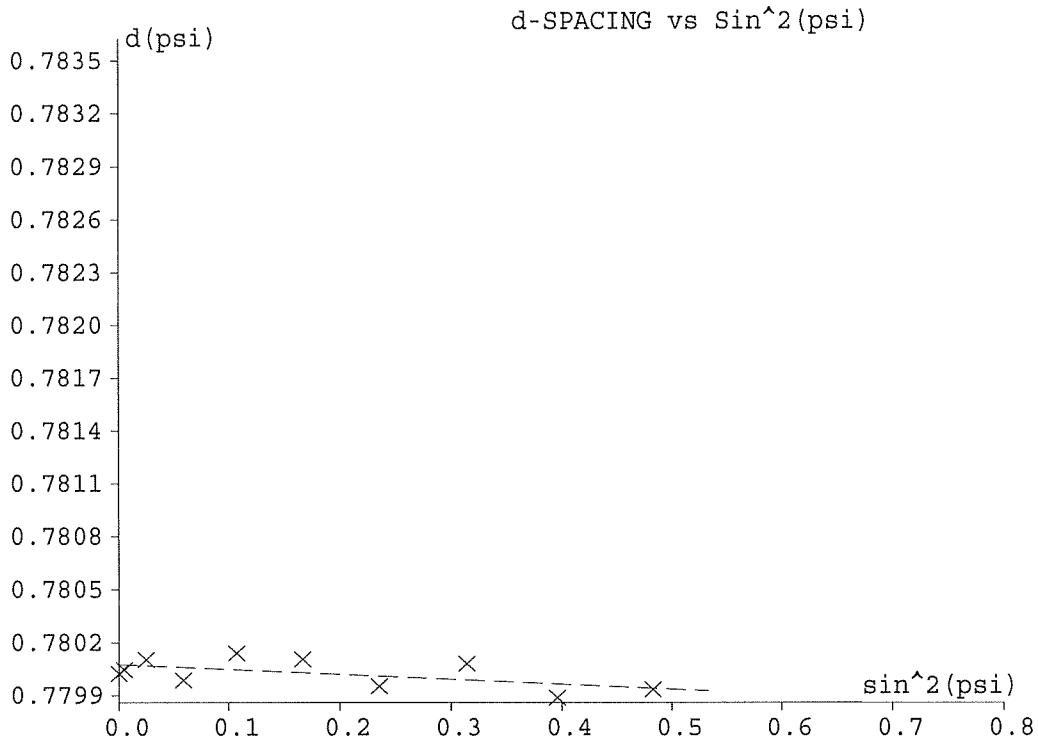
Probable error.....(+/-): 1.4 KSI 10.0 MPa

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7712.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 5 / 0.10" from Hole / Longitudinal  
Circumferential with respect to Hole / KJR

*Residual Stress.....:	-2.8 KSI	-19.6 MPa
Counting Statistics Stress Error (+/-):	0.7 KSI	4.9 MPa
Probable error.....(+/-):	1.4 KSI	10.0 MPa



===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7713.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 5 / 0.15" from Hole / Longitudinal  
Circumferential with respect to Hole / KJR

Acquisition date & time: 10/28/2005 5:39pm

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 20.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A 1.99867E-07 B -7.91049E-05 C 0.0688651 D 148.0028

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00027	165.92	963.3	4.23	0.27782	161.89	0.780006	0.000052
5.0	0.00512	164.27	1408.3	3.68	0.27316	161.79	0.780106	0.000047
10.0	0.02513	163.64	1336.9	3.68	0.27257	161.76	0.780147	0.000031
15.0	0.05874	166.98	1120.9	4.09	0.27803	161.95	0.779938	0.000041
20.0	0.10631	166.84	1163.9	4.09	0.27794	161.94	0.779947	0.000045
25.0	0.16646	165.14	1298.1	4.09	0.27635	161.84	0.780054	0.000038
30.0	0.23582	166.05	1755.5	3.99	0.27670	161.90	0.779996	0.000029
35.0	0.31408	164.87	1502.0	3.66	0.27355	161.83	0.780068	0.000029
40.0	0.39679	166.34	1226.2	3.93	0.27663	161.91	0.779977	0.000026
45.0	0.48341	166.19	916.2	4.22	0.27802	161.90	0.779989	0.000039

Fitted Delta D vs Sin^2(psi) Data:

D Spacing Intercept.....: 0.780044  
Slope of Fitted Line.....: -0.0001155  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -1.2 KSI -8.1 MPa

Counting Statistics Stress Error (+/-): 0.8 KSI 5.3 MPa  
Probable error.....(+/-): 1.4 KSI 9.5 MPa

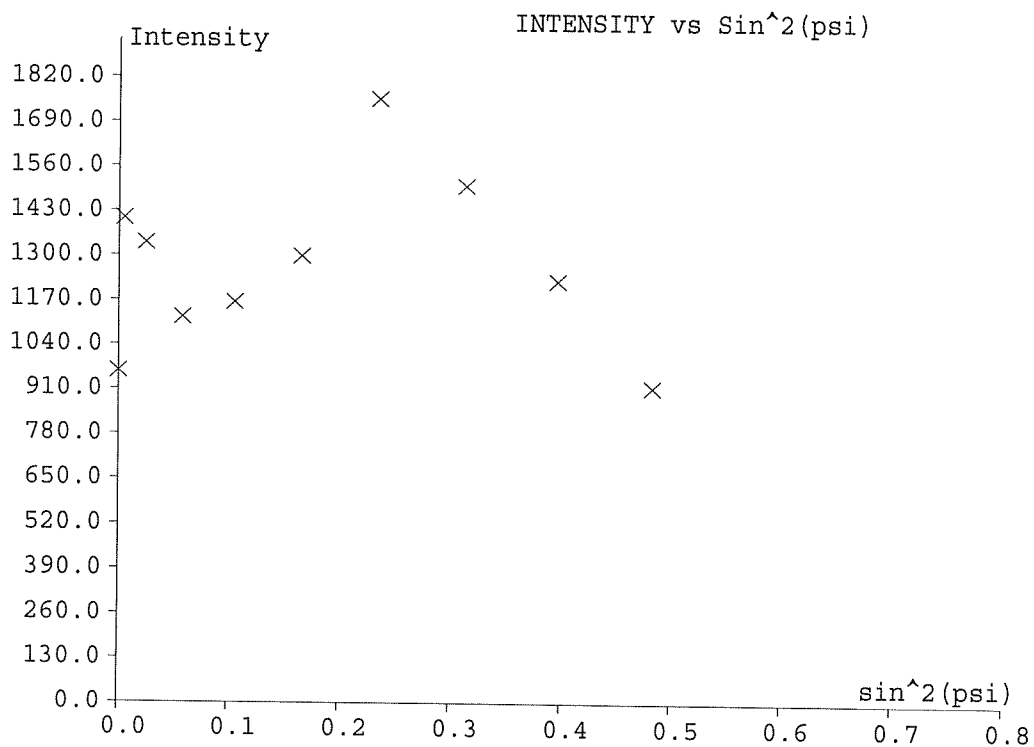
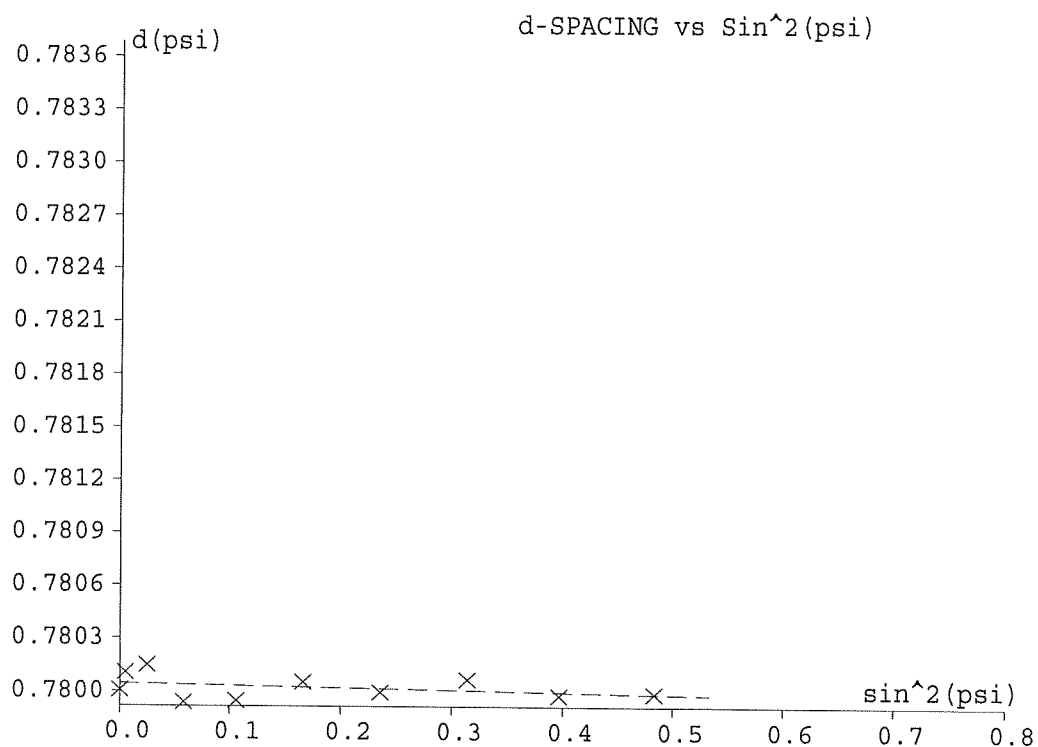
Warning: Counting statistics may be the controlling error!

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7713.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 5 / 0.15" from Hole / Longitudinal  
Circumferential with respect to Hole / KJR

*Residual Stress.....:	-1.2 KSI	-8.1 MPa
Counting Statistics Stress Error (+/-):	0.8 KSI	5.3 MPa
Probable error.....(+/-):	1.4 KSI	9.5 MPa



===== TEC Stress Analyzer v1.64 =====  
 ===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7708.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 6 / 0.05" from Hole / Longitudinal  
 Circumferential with respect to Hole / KJR

Acquisition date & time: 10/28/2005 4:56pm

Material [hkl].....: Al 5083-H23 [333]  
 Depth.....: 0.0000000  
 Phi angle.....: 0.00  
 Collimator.....: Round\_4mm  
 Bracket.....: 160s  
 Peak Bounding Range [percent].....: 20  
 X-ray Target Description and Wavelength: copper 1.54056  
 PSI Oscillation Angle Range.....: 2.00  
 Spectra count time (PSI=0).....: 20.0  
 High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
 ADC Channels Full Scale.....: 256  
 Detector Calibration Coefficients:  
 A 1.99867E-07 B -7.91049E-05 C 0.0688651 D 148.0028

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00006	149.07	1206.7	4.41	0.26546	160.91	0.781098	0.000054
5.0	0.00640	147.61	1149.4	4.41	0.26434	160.82	0.781195	0.000054
10.0	0.02738	149.83	1392.8	4.38	0.26586	160.95	0.781047	0.000044
15.0	0.06236	152.03	1291.8	4.33	0.26727	161.08	0.780902	0.000036
20.0	0.10960	156.41	1112.5	4.19	0.26975	161.33	0.780614	0.000046
25.0	0.17053	154.45	1109.7	4.35	0.26930	161.22	0.780743	0.000060
30.0	0.23831	160.32	1256.4	4.40	0.27418	161.56	0.780363	0.000054
35.0	0.31497	163.04	1769.5	4.20	0.27496	161.72	0.780188	0.000040
40.0	0.39557	168.84	1333.5	4.31	0.28099	162.06	0.779822	0.000032
45.0	0.48083	171.27	811.9	4.38	0.28365	162.20	0.779671	0.000057

Fitted Delta D vs Sin^2(psi) Data:

D Spacing Intercept.....: 0.781124  
 Slope of Fitted Line.....: -0.003096  
 Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -31.6 KSI -217.7 MPa

Counting Statistics Stress Error (+/-): 1.0 KSI 6.7 MPa

Probable error.....(+/-): 1.9 KSI 12.8 MPa

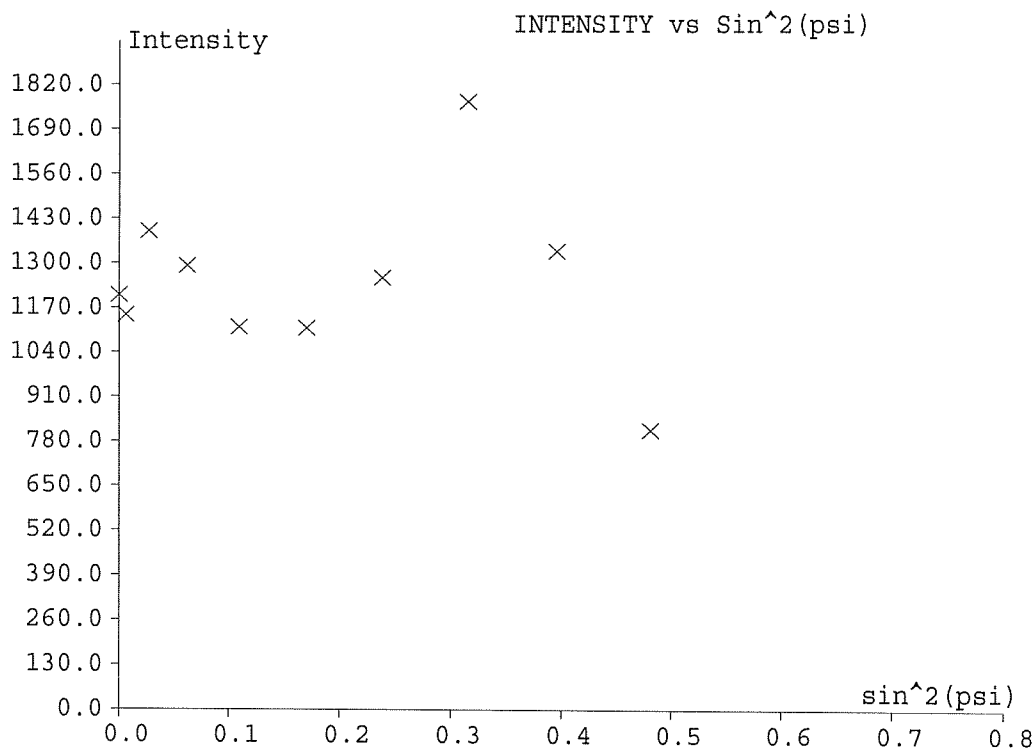
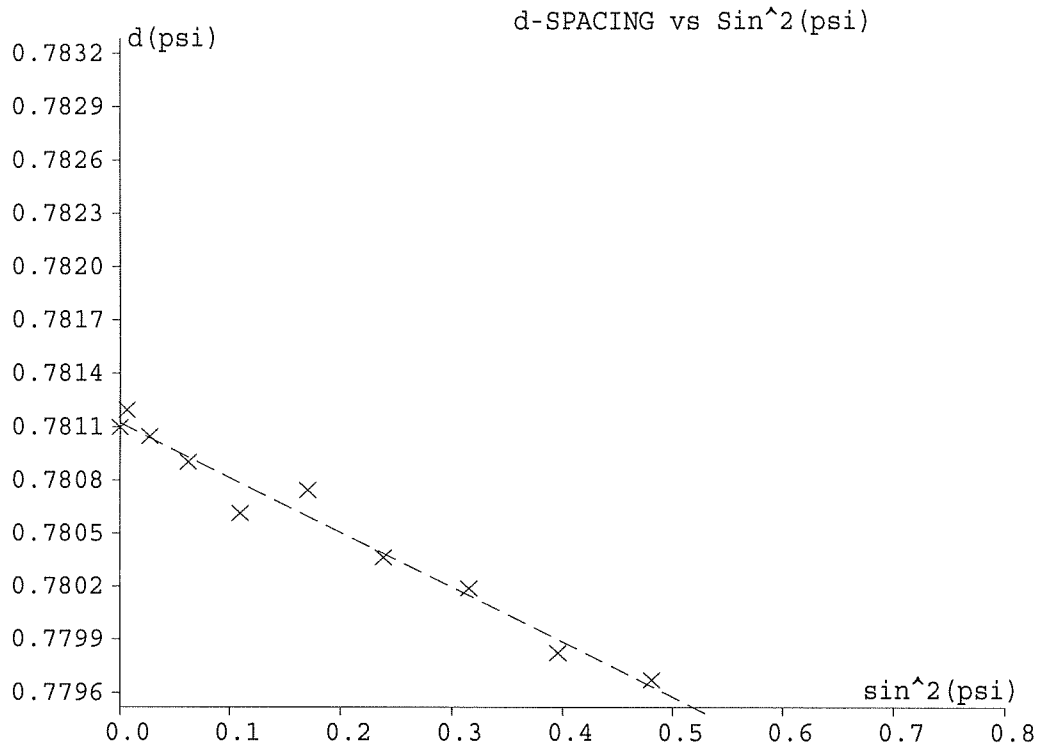
Warning: Counting statistics may be the controlling error!

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7708.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 6 / 0.05" from Hole / Longitudinal  
Circumferential with respect to Hole / KJR

\*Residual Stress.....: -31.6 KSI -217.7 MPa  
Counting Statistics Stress Error (+/-): 1.0 KSI 6.7 MPa  
Probable error.....(+/-): 1.9 KSI 12.8 MPa





===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7709.STR  
Sample Description:  
SBIR / WP / CW Holes / AF Std 6 / 0.10" from Hole / Longitudinal  
Circumferential with respect to Hole / KJR

Acquisition date & time: 10/28/2005 5:02pm

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 20.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A 1.99867E-07 B -7.91049E-05 C 0.0688651 D 148.0028

Psi	Sin <sup>2</sup> (psi)	Pk Chan	Intens	FWHM	Kalp Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00012	155.44	1238.3	4.41	0.27045	161.28	0.780679	0.000048
5.0	0.00593	153.48	1237.9	4.22	0.26768	161.16	0.780806	0.000045
10.0	0.02650	155.18	1594.1	4.08	0.26833	161.26	0.780694	0.000045
15.0	0.06177	154.40	1451.7	3.86	0.26677	161.22	0.780744	0.000041
20.0	0.10888	158.67	1366.2	4.20	0.27155	161.47	0.780468	0.000044
25.0	0.16948	157.18	1572.0	4.14	0.27012	161.38	0.780564	0.000037
30.0	0.23870	159.38	1775.3	4.18	0.27202	161.51	0.780422	0.000030
35.0	0.31522	162.51	2035.2	4.08	0.27397	161.69	0.780221	0.000029
40.0	0.39678	166.39	1543.0	4.22	0.27817	161.91	0.779976	0.000038
45.0	0.48409	164.83	919.2	4.10	0.27609	161.82	0.780074	0.000041

Fitted Delta D vs Sin<sup>2</sup>(psi) Data:  
D Spacing Intercept.....: 0.780755  
Slope of Fitted Line.....: -0.001604  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -16.4 KSI -112.9 MPa

Counting Statistics Stress Error (+/-): 0.8 KSI 5.7 MPa  
Probable error.....(+/-): 1.8 KSI 12.7 MPa

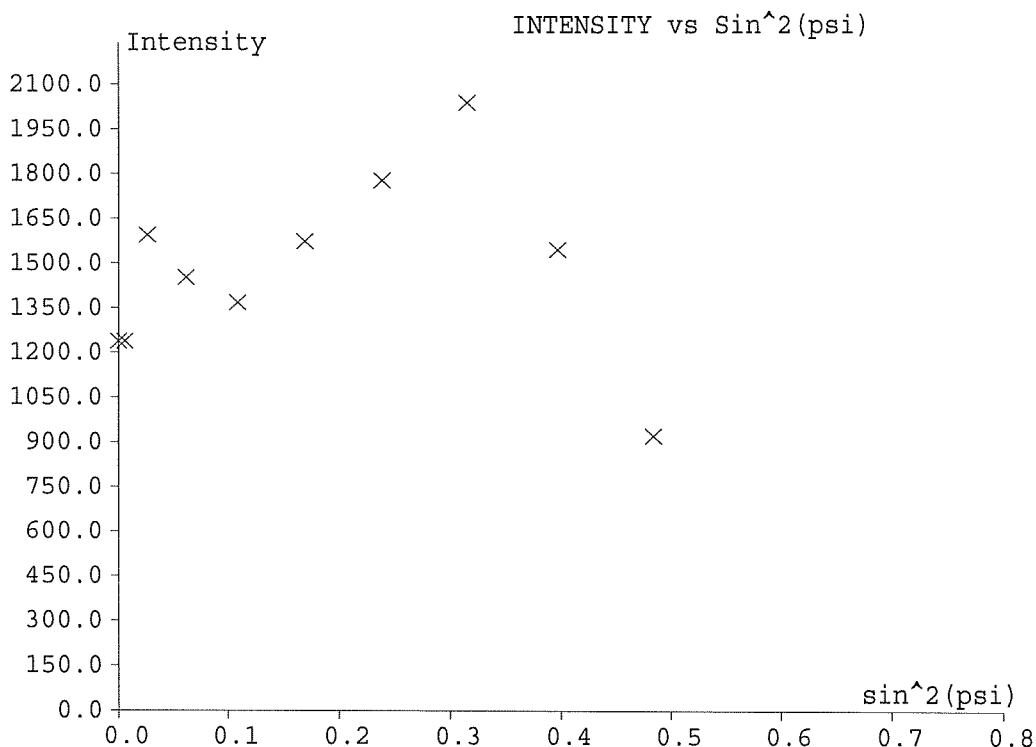
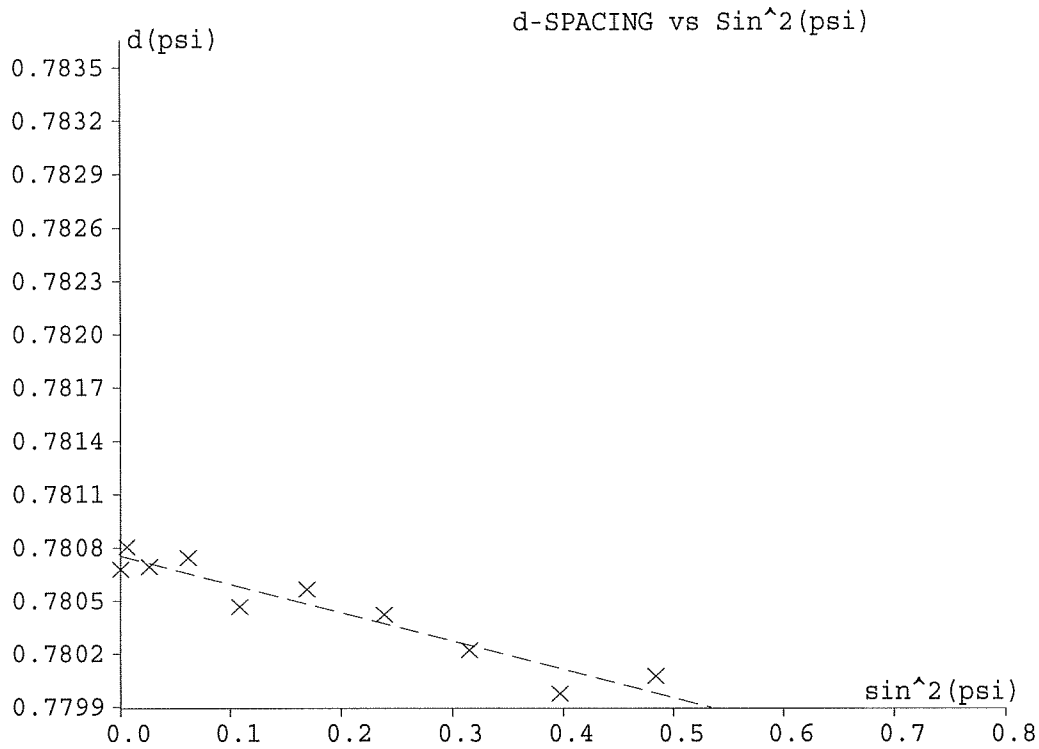
File: C:\STRESS\DATA\2143\2005\SBIR\50632\7709.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 6 / 0.10" from Hole / Longitudinal

Circumferential with respect to Hole / KJR

*Residual Stress.....:	-16.4 KSI	-112.9 MPa
Counting Statistics Stress Error (+/-):	0.8 KSI	5.7 MPa
Probable error.....(+/-):	1.8 KSI	12.7 MPa



===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7710.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 6 / 0.15" from Hole / Longitudinal  
Circumferential with respect to Hole / KJR

Acquisition date & time: 10/28/2005 5:11pm

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 20.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A 1.99867E-07 B -7.91049E-05 C 0.0688651 D 148.0028

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00019	160.96	1165.8	4.65	0.27604	161.60	0.780324	0.000047
5.0	0.00558	158.05	1290.2	3.71	0.26842	161.43	0.780505	0.000043
10.0	0.02602	158.14	1639.0	4.28	0.27168	161.43	0.780503	0.000035
15.0	0.06099	157.64	1257.6	4.33	0.27159	161.40	0.780536	0.000047
20.0	0.10855	159.74	1360.5	4.18	0.27228	161.53	0.780399	0.000044
25.0	0.16871	159.20	1460.5	3.97	0.27088	161.50	0.780433	0.000033
30.0	0.23864	159.50	1649.1	3.82	0.27037	161.52	0.780413	0.000028
35.0	0.31660	159.58	1853.4	4.16	0.27208	161.52	0.780409	0.000029
40.0	0.39810	163.73	1265.5	4.05	0.27486	161.76	0.780143	0.000049
45.0	0.48518	162.67	942.7	3.91	0.27326	161.70	0.780210	0.000032

Fitted Delta D vs Sin^2(psi) Data:

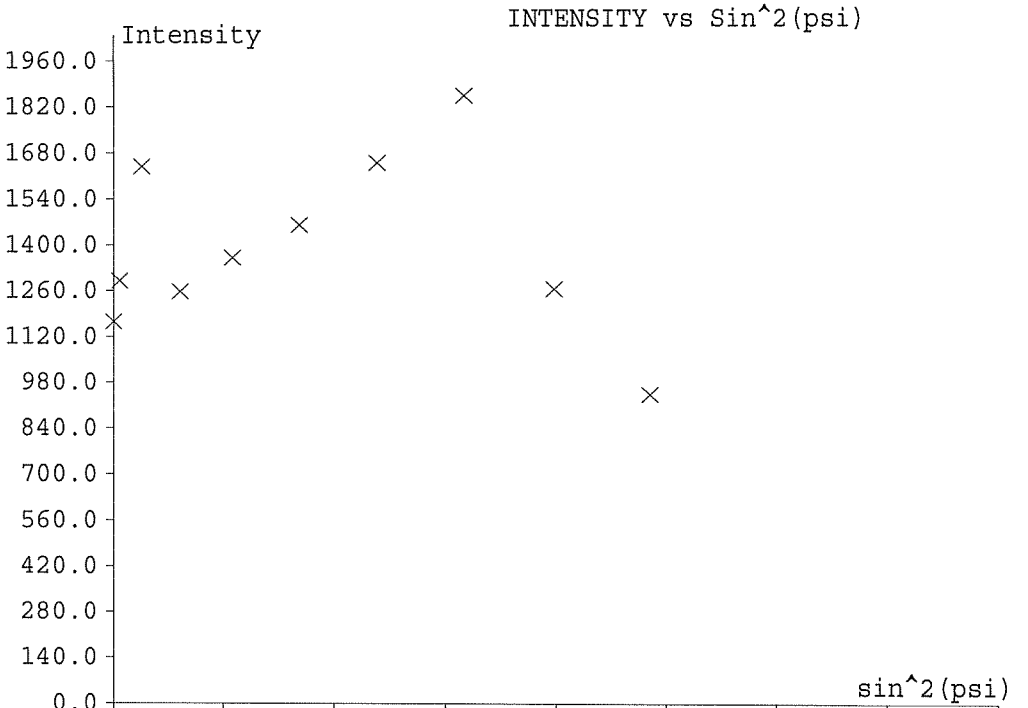
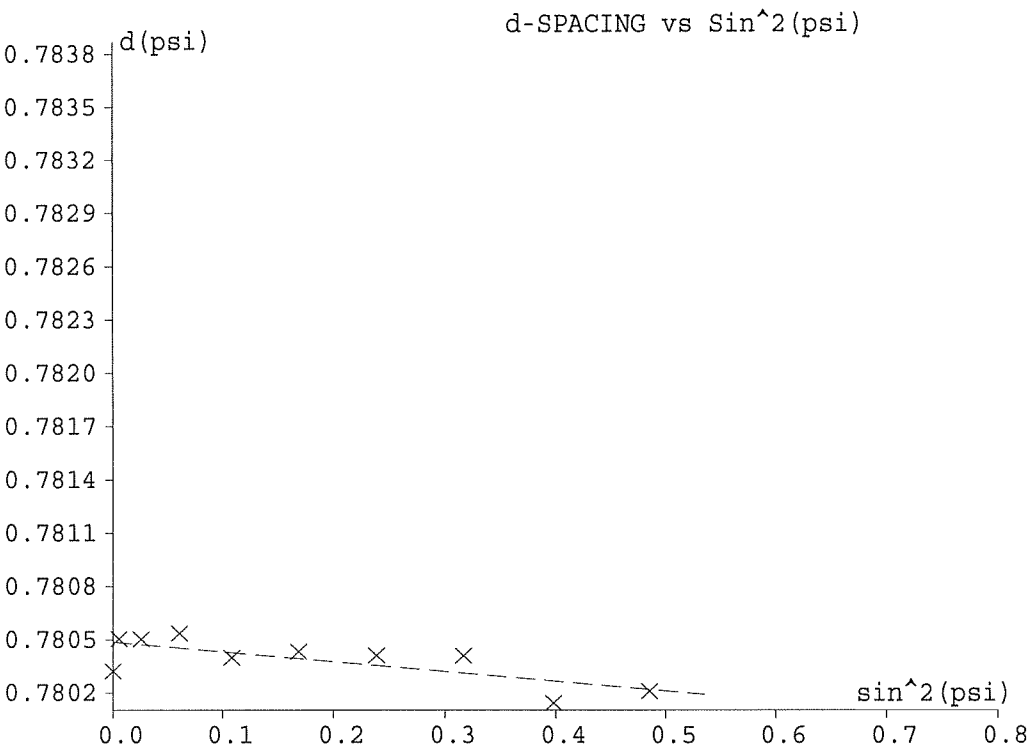
D Spacing Intercept.....: 0.780488  
Slope of Fitted Line.....: -0.0005543  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -5.7 KSI -39.0 MPa

Counting Statistics Stress Error (+/-): 0.8 KSI 5.4 MPa  
Probable error.....(+/-): 1.8 KSI 12.3 MPa

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7710.STR  
Sample Description:  
SBIR / WP / CW Holes / AF Std 6 / 0.15" from Hole / Longitudinal  
Circumferential with respect to Hole / KJR

\*Residual Stress.....: -5.7 KSI -39.0 MPa  
Counting Statistics Stress Error (+/-): 0.8 KSI 5.4 MPa  
Probable error.....(+/-): 1.8 KSI 12.3 MPa



===== TEC Stress Analyzer v1.64 =====  
 ===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7705.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 7 / 0.05" from Hole / Longitudinal  
 Circumferential with respect to Hole / ebm

Acquisition date & time: 10/28/2005 3:58pm

Material [hkl].....: Al 5083-H23 [333]  
 Depth.....: 0.0000000  
 Phi angle.....: 0.00  
 Collimator.....: Round\_4mm  
 Bracket.....: 160s  
 Peak Bounding Range [percent].....: 20  
 X-ray Target Description and Wavelength: copper 1.54056  
 PSI Oscillation Angle Range.....: 2.00  
 Spectra count time (PSI=0).....: 20.0  
 High Voltage(kV) and Beam Current(mA)... 45.00 1.50  
 ADC Channels Full Scale.....: 256  
 Detector Calibration Coefficients:  
 A 1.99867E-07 B -7.91049E-05 C 0.0688651 D 148.0028

Psi	Sin <sup>2</sup> (psi)	Pk Chan	Intens	FWHM	Kalp	Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00005	146.88	948.9	4.67	0.26491		160.78	0.781245	0.000057
5.0	0.00650	146.41	1050.7	4.33	0.26290		160.75	0.781275	0.000060
10.0	0.02765	148.18	1313.1	4.09	0.26296		160.86	0.781155	0.000039
15.0	0.06195	153.72	1172.0	4.47	0.26948		161.18	0.780792	0.000067
20.0	0.10985	155.67	1011.0	4.46	0.27094		161.29	0.780665	0.000062
25.0	0.16973	156.53	977.4	4.16	0.26971		161.34	0.780607	0.000048
30.0	0.23890	158.92	1269.8	4.12	0.27135		161.48	0.780452	0.000055
35.0	0.31442	164.19	1434.5	4.01	0.27505		161.79	0.780114	0.000043
40.0	0.39591	168.12	1226.6	4.06	0.27895		162.02	0.779866	0.000036
45.0	0.47995	173.01	850.0	4.50	0.28587		162.30	0.779564	0.000056

Fitted Delta D vs Sin<sup>2</sup>(psi) Data:

D Spacing Intercept.....: 0.781183  
 Slope of Fitted Line.....: -0.00338  
 Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -34.5 KSI -237.7 MPa

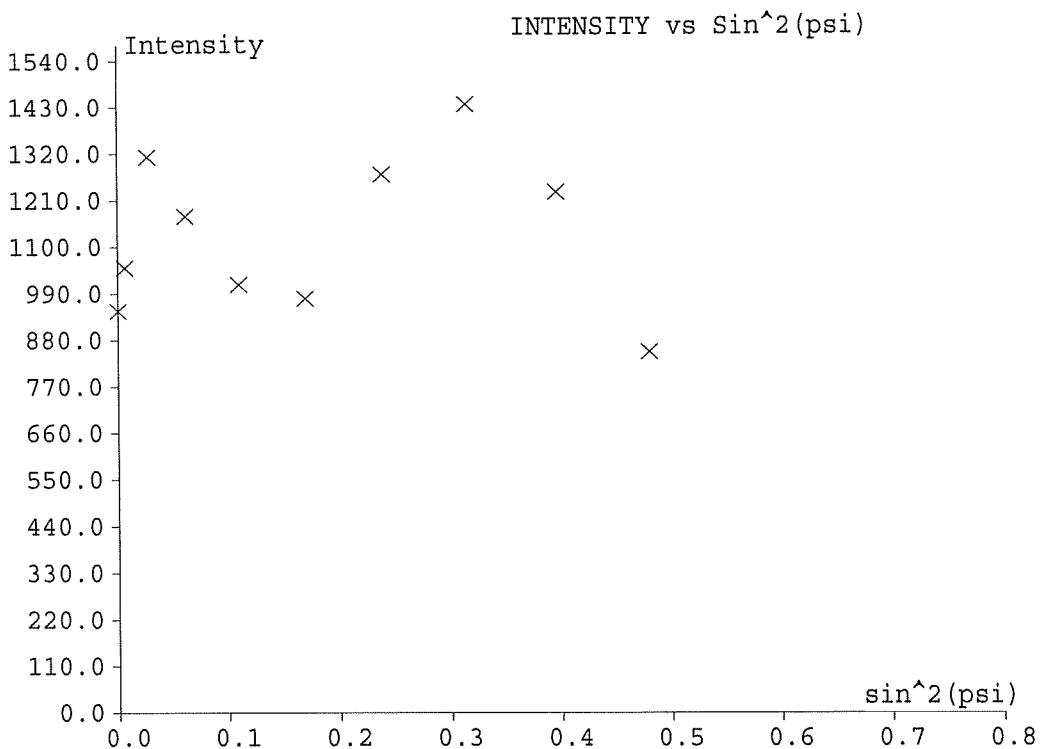
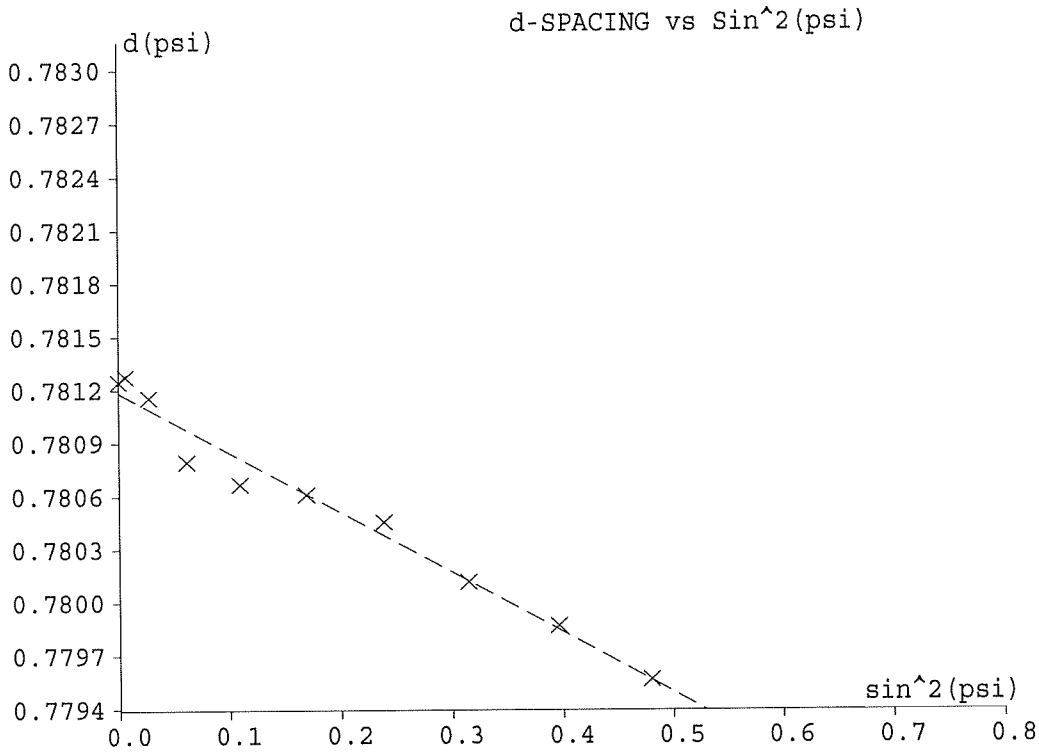
Counting Statistics Stress Error (+/-): 1.0 KSI 7.2 MPa  
 Probable error.....(+/-): 2.0 KSI 13.9 MPa  
 Warning: Counting statistics may be the controlling error!

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7705.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 7 / 0.05" from Hole / Longitudinal  
Circumferential with respect to Hole / ebm

*Residual Stress.....:	-34.5 KSI	-237.7 MPa
Counting Statistics Stress Error (+/-):	1.0 KSI	7.2 MPa
Probable error.....(+/-):	2.0 KSI	13.9 MPa



===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7706.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 7 / 0.10" from Hole / Longitudinal  
Circumferential with respect to Hole / ebm

Acquisition date & time: 10/28/2005 4:03pm

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round 4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 20.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A 1.99867E-07 B -7.91049E-05 C 0.0688651 D 148.0028

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00010	153.69	1272.9	4.48	0.26948	161.17	0.780794	0.000051
5.0	0.00622	149.90	1312.1	4.37	0.26585	160.96	0.781043	0.000041
10.0	0.02712	151.40	1509.2	4.15	0.26569	161.04	0.780942	0.000040
15.0	0.06161	155.09	1263.4	4.30	0.26946	161.26	0.780701	0.000050
20.0	0.10907	158.09	1401.5	4.20	0.27113	161.43	0.780506	0.000048
25.0	0.16883	158.90	1381.0	4.12	0.27133	161.48	0.780453	0.000051
30.0	0.23813	160.71	1571.8	4.18	0.27306	161.58	0.780337	0.000033
35.0	0.31502	162.93	1598.2	4.04	0.27409	161.71	0.780194	0.000041
40.0	0.39732	165.28	1399.2	4.05	0.27628	161.85	0.780045	0.000026
45.0	0.48205	168.86	1039.4	4.22	0.28047	162.06	0.779821	0.000032

Fitted Delta D vs Sin^2(psi) Data:

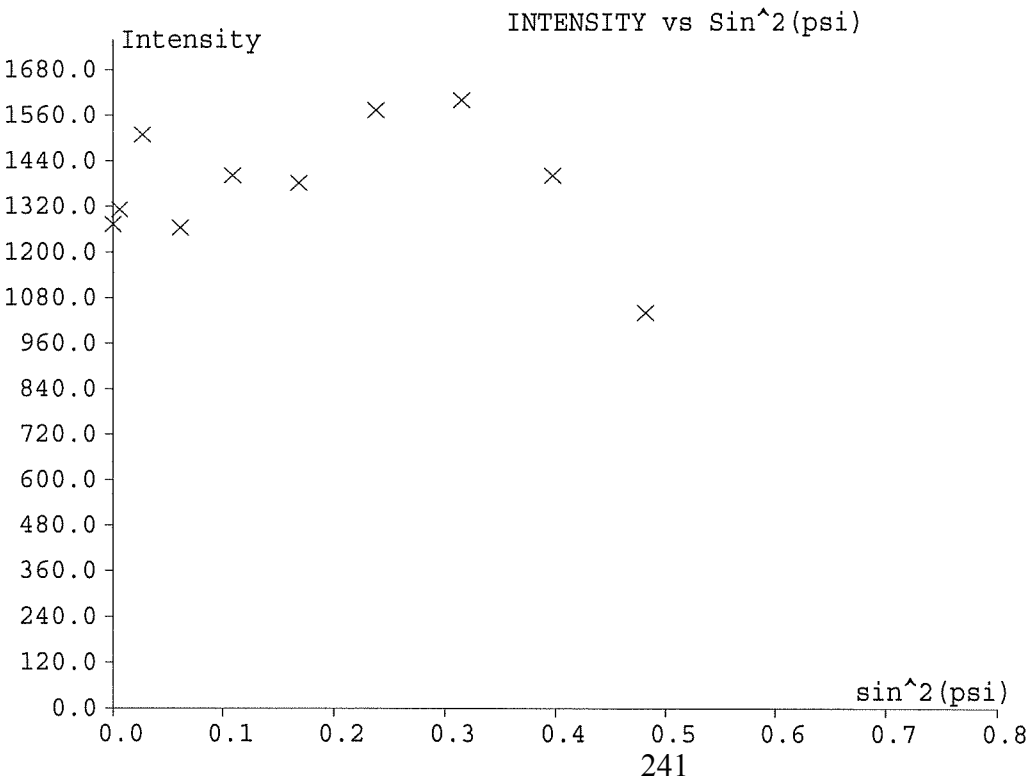
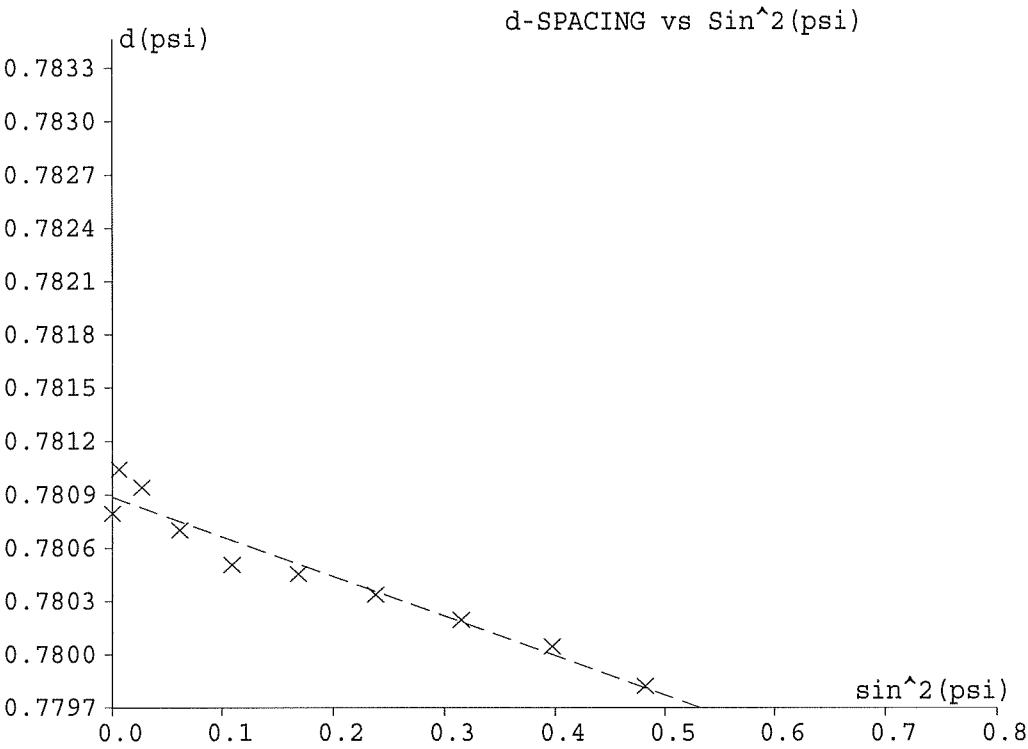
D Spacing Intercept.....: 0.780888  
Slope of Fitted Line.....: -0.002237  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -22.8 KSI -157.4 MPa

Counting Statistics Stress Error (+/-): 0.8 KSI 5.2 MPa  
Probable error.....(+/-): 2.0 KSI 13.5 MPa

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7706.STR  
Sample Description:  
SBIR / WP / CW Holes / AF Std 7 / 0.10" from Hole / Longitudinal  
Circumferential with respect to Hole / ebm

\*Residual Stress.....: -22.8 KSI -157.4 MPa  
Counting Statistics Stress Error (+/-): 0.8 KSI 5.2 MPa  
Probable error.....(+/-): 2.0 KSI 13.5 MPa





===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7707.STR  
Sample Description:  
SBIR / WP / CW Holes / AF Std 7 / 0.15" from Hole / Longitudinal  
Circumferential with respect to Hole / ebm

Acquisition date & time: 10/28/2005 4:08pm

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 20.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A 1.99867E-07 B -7.91049E-05 C 0.0688651 D 148.0028

Psi	Sin <sup>2</sup> (psi)	Pk Chan	Intens	FWHM	Kalp	Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00016	158.11	1068.3	4.42	0.27256		161.43	0.780506	0.000053
5.0	0.00566	157.00	1285.9	4.03	0.26950		161.37	0.780575	0.000039
10.0	0.02615	157.29	1594.7	3.86	0.26896		161.39	0.780556	0.000037
15.0	0.06060	159.24	1217.6	4.34	0.27291		161.50	0.780433	0.000044
20.0	0.10909	158.01	1456.9	4.15	0.27081		161.43	0.780511	0.000043
25.0	0.16814	160.73	1326.5	4.18	0.27306		161.58	0.780336	0.000035
30.0	0.23846	159.89	1643.6	3.58	0.26889		161.54	0.780386	0.000031
35.0	0.31466	163.68	1728.8	3.79	0.27340		161.76	0.780145	0.000025
40.0	0.39820	163.53	1291.8	4.23	0.27556		161.75	0.780157	0.000027
45.0	0.48178	169.38	1011.5	4.21	0.28095		162.09	0.779788	0.000040

Fitted Delta D vs Sin<sup>2</sup>(psi) Data:  
D Spacing Intercept.....: 0.780581  
Slope of Fitted Line.....: -0.001343  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -13.7 KSI -94.5 MPa

Counting Statistics Stress Error (+/-): 0.8 KSI 5.3 MPa  
Probable error.....(+/-): 1.8 KSI 12.4 MPa

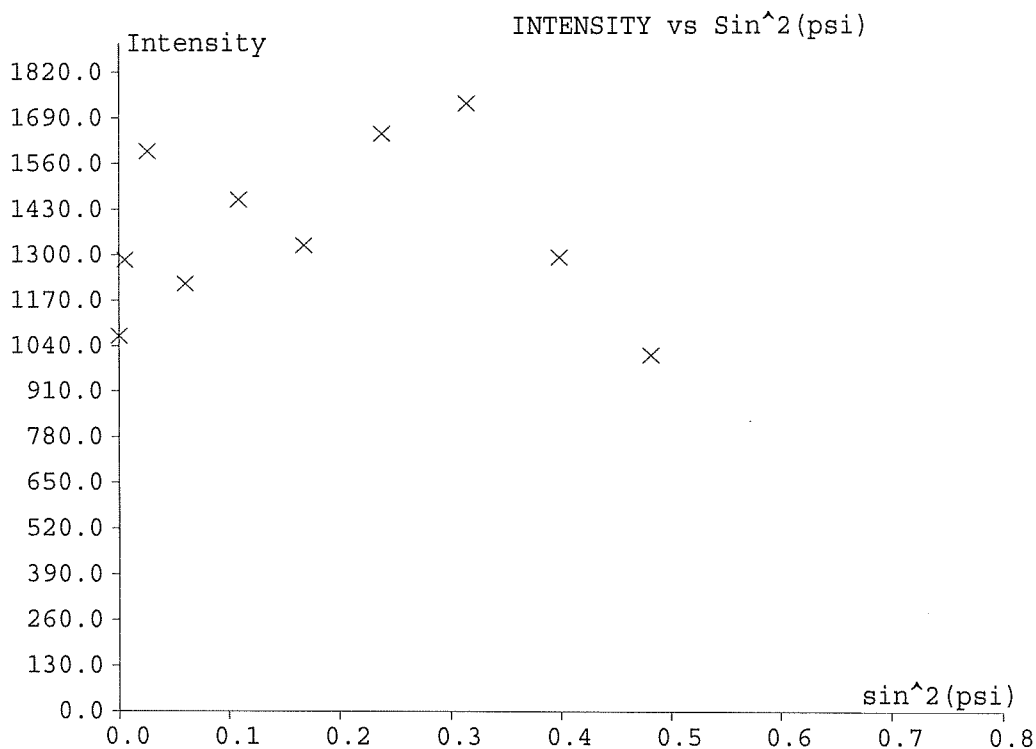
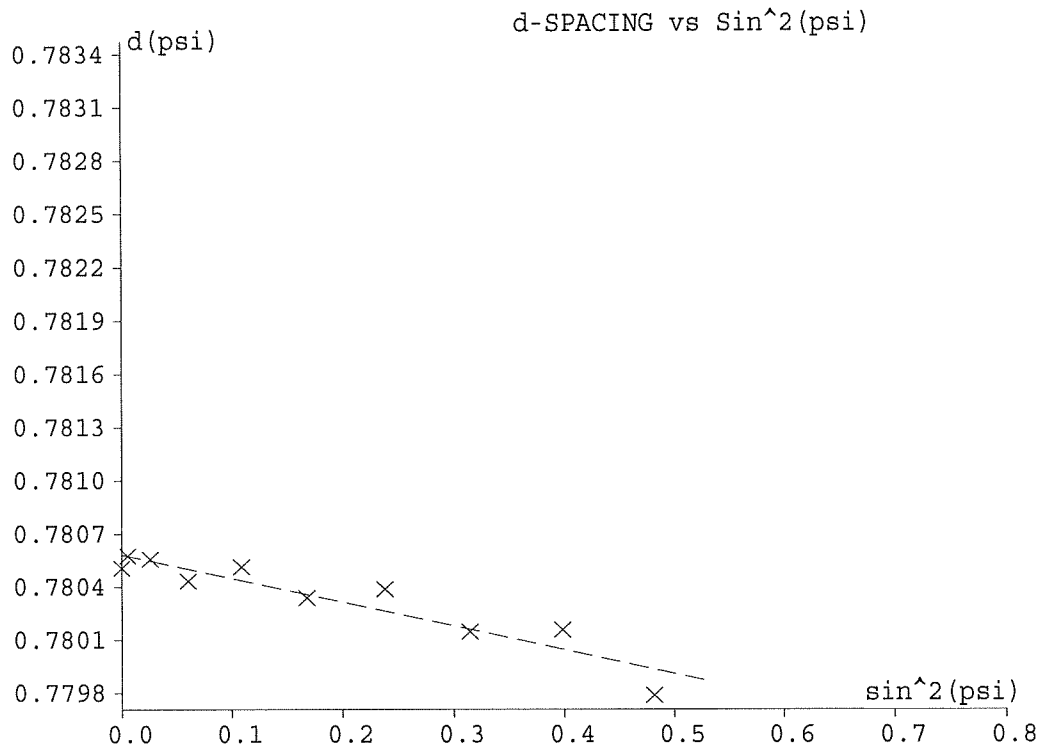
File: C:\STRESS\DATA\2143\2005\SBIR\50632\7707.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 7 / 0.15" from Hole / Longitudinal

Circumferential with respect to Hole / ebm

*Residual Stress.....:	-13.7 KSI	-94.5 MPa
Counting Statistics Stress Error (+/-):	0.8 KSI	5.3 MPa
Probable error.....(+/-):	1.8 KSI	12.4 MPa



===== TEC Stress Analyzer v1.64 =====  
 ===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7702.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 8 / 0.05" from Hole / Longitudinal  
 Circumferential with respect to Hole / ebm

Acquisition date & time: 10/28/2005 3:42pm

Material [hkl].....: Al 5083-H23 [333]  
 Depth.....: 0.0000000  
 Phi angle.....: 0.00  
 Collimator.....: Round\_4mm  
 Bracket.....: 160s  
 Peak Bounding Range [percent].....: 20  
 X-ray Target Description and Wavelength: copper 1.54056  
 PSI Oscillation Angle Range.....: 2.00  
 Spectra count time (PSI=0).....: 20.0  
 High Voltage(kV) and Beam Current(mA)... 45.00 1.50  
 ADC Channels Full Scale.....: 256  
 Detector Calibration Coefficients:  
 A 1.99867E-07 B -7.91049E-05 C 0.0688651 D 148.0028

Psi	Sin <sup>2</sup> (psi)	Pk Chan	Intens	FWHM	Kalp Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00009	152.28	938.2	4.20	0.26664	161.09	0.780884	0.000056
5.0	0.00618	150.34	1353.8	4.34	0.26603	160.98	0.781013	0.000044
10.0	0.02730	150.28	1540.4	4.39	0.26628	160.98	0.781018	0.000044
15.0	0.06183	154.22	1125.9	4.69	0.27076	161.20	0.780761	0.000061
20.0	0.10958	156.48	962.5	4.29	0.27045	161.34	0.780611	0.000050
25.0	0.16863	159.42	1162.7	4.12	0.27177	161.51	0.780420	0.000049
30.0	0.23788	161.30	1433.9	4.36	0.27465	161.62	0.780301	0.000035
35.0	0.31405	164.99	1638.2	3.99	0.27571	161.83	0.780063	0.000034
40.0	0.39446	171.04	1100.0	4.12	0.28200	162.19	0.779684	0.000047
45.0	0.47954	173.80	752.1	4.36	0.28582	162.35	0.779514	0.000088

Fitted Delta D vs Sin<sup>2</sup>(psi) Data:

D Spacing Intercept.....: 0.780987  
 Slope of Fitted Line.....: -0.003113  
 Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -31.8 KSI -219.0 MPa

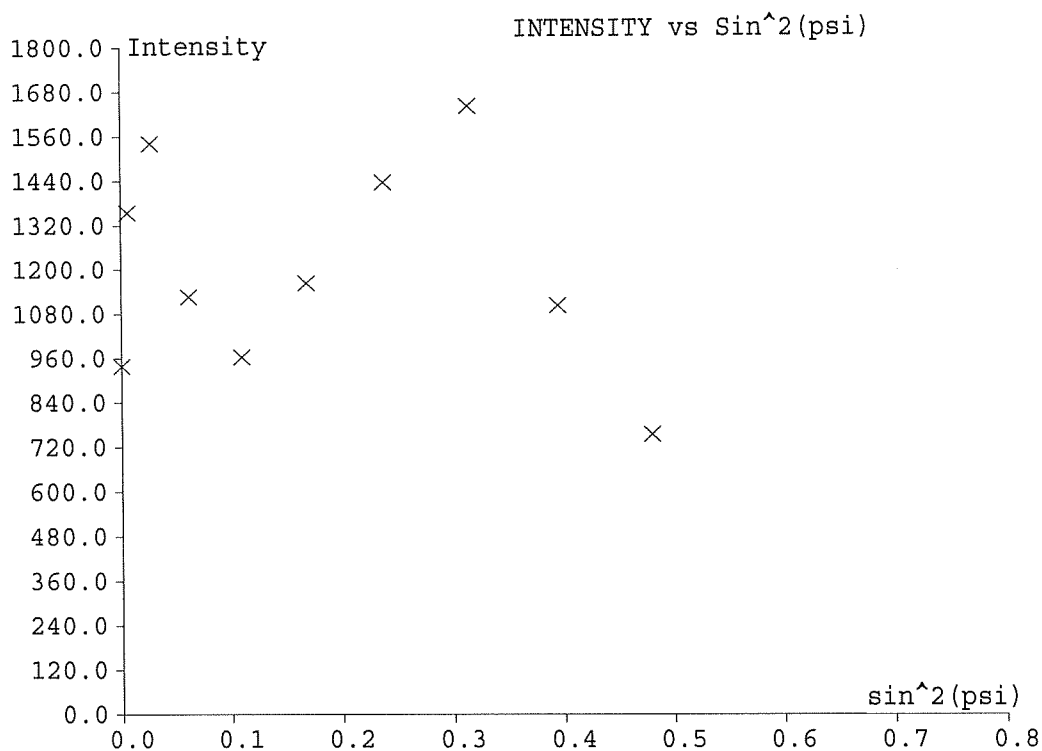
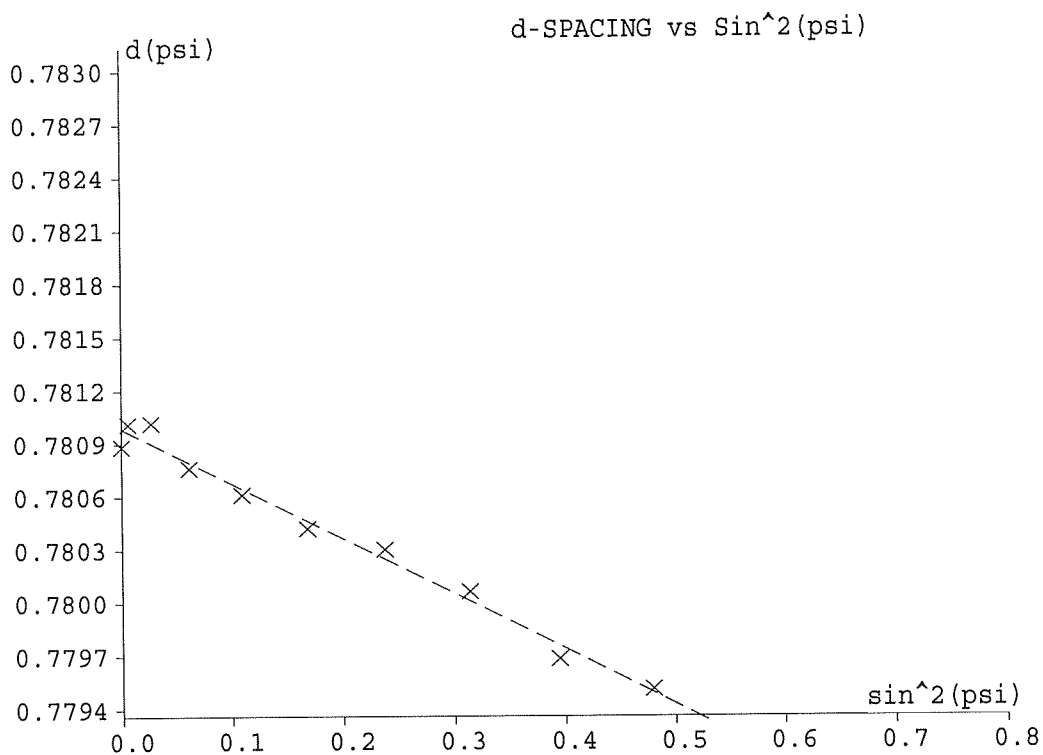
Counting Statistics Stress Error (+/-): 1.3 KSI 8.9 MPa  
 Probable error.....(+/-): 1.4 KSI 9.9 MPa  
 Warning: Counting statistics may be the controlling error!

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7702.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 8 / 0.05" from Hole / Longitudinal  
Circumferential with respect to Hole / ebm

*Residual Stress.....:	-31.8 KSI	-219.0 MPa
Counting Statistics Stress Error (+/-):	1.3 KSI	8.9 MPa
Probable error.....(+/-):	1.4 KSI	9.9 MPa



===== TEC Stress Analyzer v1.64 =====  
 ===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7703.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 8 / 0.10" from Hole / Longitudinal  
 Circumferential with respect to Hole / ebm

Acquisition date & time: 10/28/2005 3:47pm

Material [hkl].....: Al 5083-H23 [333]  
 Depth.....: 0.0000000  
 Phi angle.....: 0.00  
 Collimator.....: Round\_4mm  
 Bracket.....: 160s  
 Peak Bounding Range [percent].....: 20  
 X-ray Target Description and Wavelength: copper 1.54056  
 PSI Oscillation Angle Range.....: 2.00  
 Spectra count time (PSI=0).....: 20.0  
 High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
 ADC Channels Full Scale.....: 256  
 Detector Calibration Coefficients:  
 A 1.99867E-07 B -7.91049E-05 C 0.0688651 D 148.0028

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00010	153.43	1000.0	4.10	0.26704	161.16	0.780808	0.000051
5.0	0.00602	152.38	1306.4	4.51	0.26867	161.10	0.780880	0.000060
10.0	0.02661	154.48	1521.1	3.81	0.26653	161.22	0.780739	0.000032
15.0	0.06237	151.97	1185.8	4.23	0.26655	161.08	0.780905	0.000035
20.0	0.10991	155.43	1226.6	4.20	0.26907	161.28	0.780679	0.000040
25.0	0.16900	158.44	1491.9	3.98	0.27036	161.45	0.780482	0.000035
30.0	0.23727	162.69	1658.7	4.10	0.27416	161.70	0.780210	0.000035
35.0	0.31401	165.06	1541.5	3.96	0.27563	161.84	0.780058	0.000032
40.0	0.39490	170.20	1022.3	4.43	0.28294	162.13	0.779738	0.000034
45.0	0.48177	169.39	931.5	3.97	0.27966	162.09	0.779786	0.000038

Fitted Delta D vs Sin^2(psi) Data:

D Spacing Intercept.....: 0.780889  
 Slope of Fitted Line.....: -0.002554  
 Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -26.1 KSI -179.7 MPa

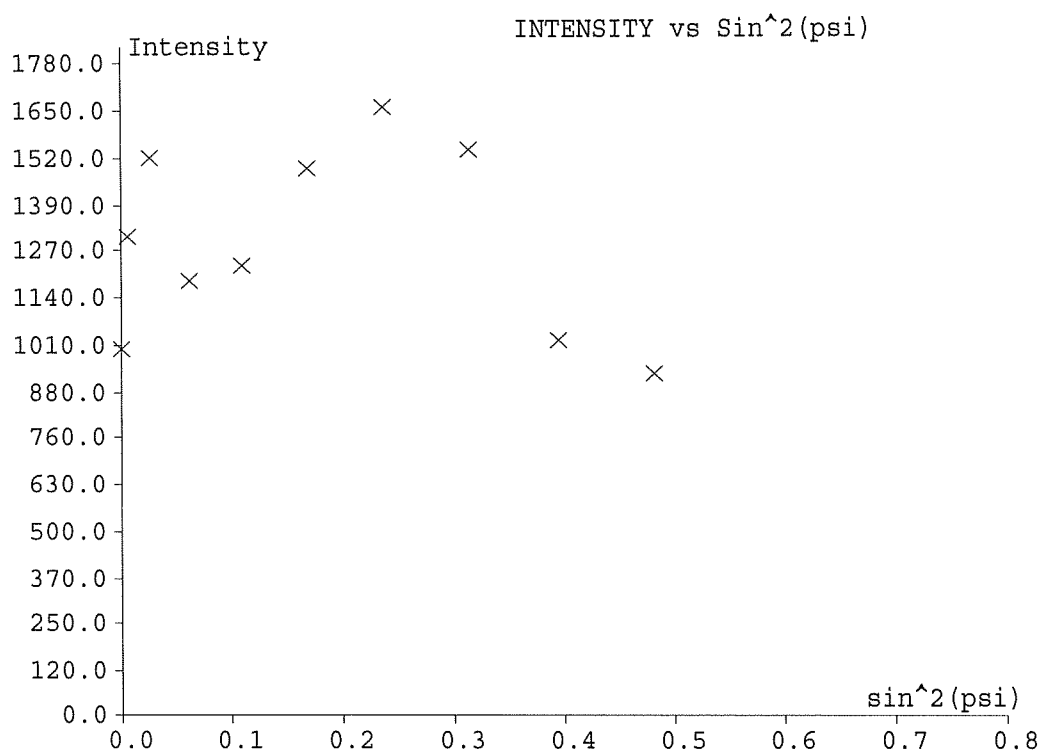
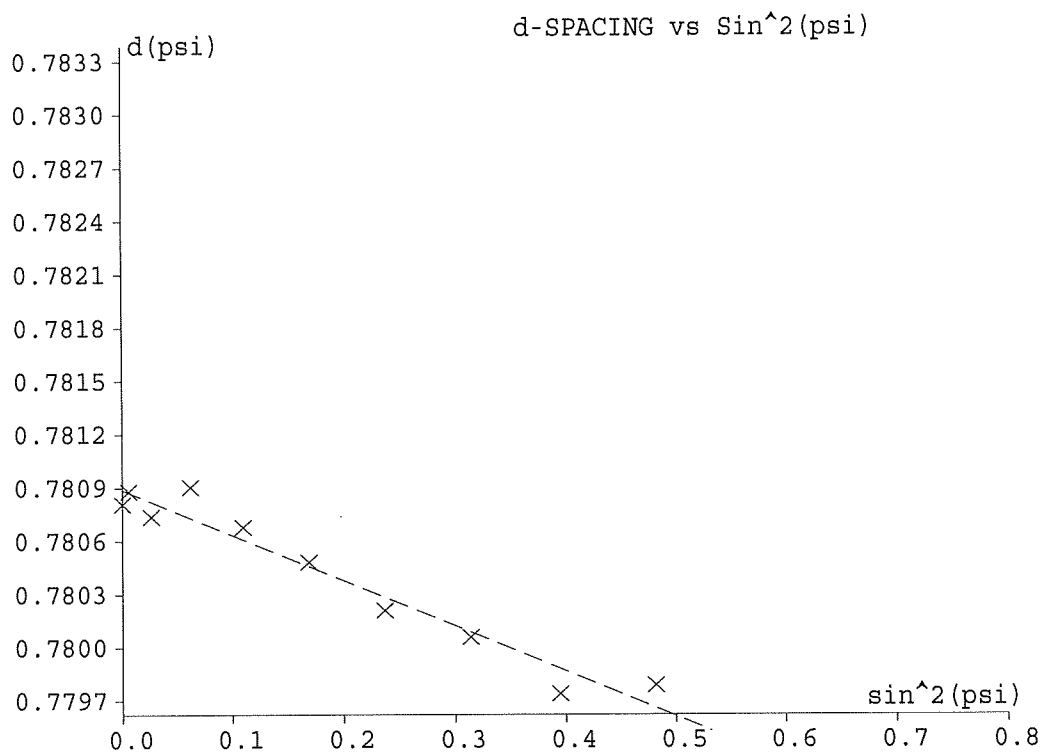
Counting Statistics Stress Error (+/-): 0.8 KSI 5.7 MPa  
 Probable error.....(+/-): 2.1 KSI 14.7 MPa

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7703.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 8 / 0.10" from Hole / Longitudinal  
Circumferential with respect to Hole / ebm

*Residual Stress.....:	-26.1 KSI	-179.7 MPa
Counting Statistics Stress Error (+/-):	0.8 KSI	5.7 MPa
Probable error.....(+/-):	2.1 KSI	14.7 MPa



===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7704.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 8 / 0.15" from Hole / Longitudinal  
Circumferential with respect to Hole / ebm

Acquisition date & time: 10/28/2005 3:52pm

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 20.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A 1.99867E-07 B -7.91049E-05 C 0.0688651 D 148.0028

Psi	Sin <sup>2</sup> (psi)	Pk Chan	Intens	FWHM	Kalp Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00015	157.43	1182.4	4.12	0.27023	161.39	0.780548	0.000046
5.0	0.00558	158.16	1255.2	4.61	0.27373	161.43	0.780504	0.000057
10.0	0.02606	157.87	1561.2	4.14	0.27063	161.42	0.780520	0.000037
15.0	0.06048	159.73	1204.8	4.27	0.27288	161.53	0.780400	0.000057
20.0	0.10813	161.08	1268.9	4.24	0.27371	161.60	0.780314	0.000040
25.0	0.16838	160.08	1339.3	4.09	0.27213	161.55	0.780377	0.000033
30.0	0.23662	164.21	1629.9	4.18	0.27589	161.79	0.780113	0.000050
35.0	0.31392	165.25	1769.6	3.90	0.27549	161.85	0.780046	0.000035
40.0	0.39678	166.40	984.5	4.22	0.27819	161.91	0.779975	0.000037
45.0	0.48290	167.15	1144.2	3.81	0.27669	161.96	0.779926	0.000034

Fitted Delta D vs Sin<sup>2</sup>(psi) Data:

D Spacing Intercept.....: 0.780513  
Slope of Fitted Line.....: -0.00134  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -13.7 KSI -94.3 MPa

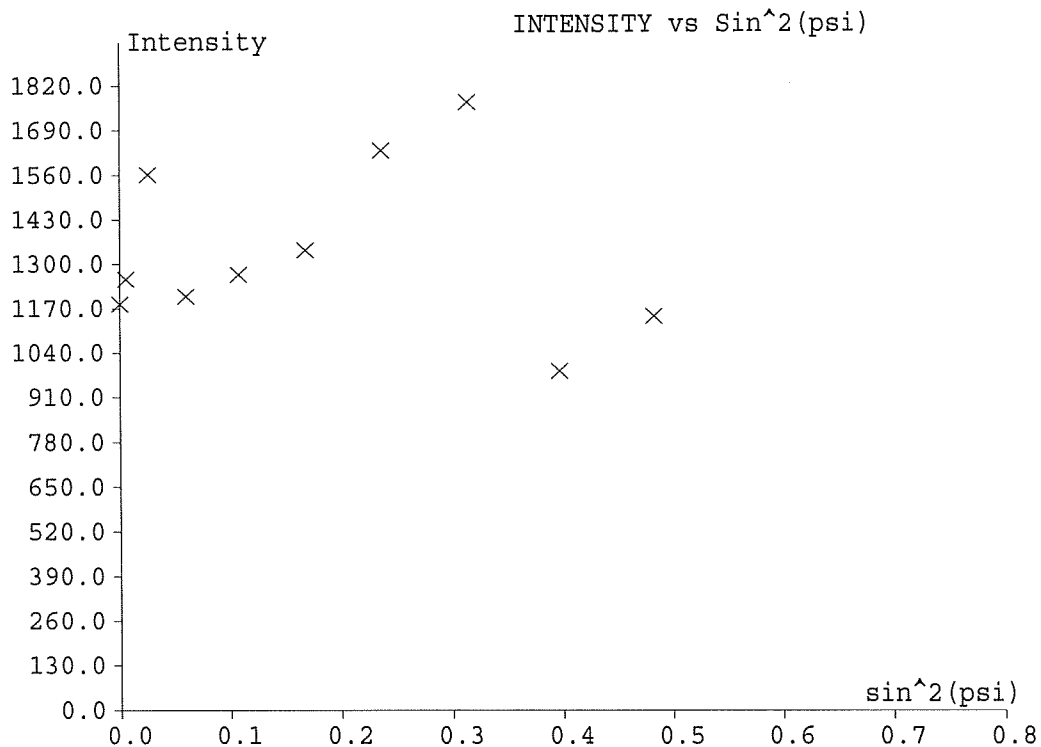
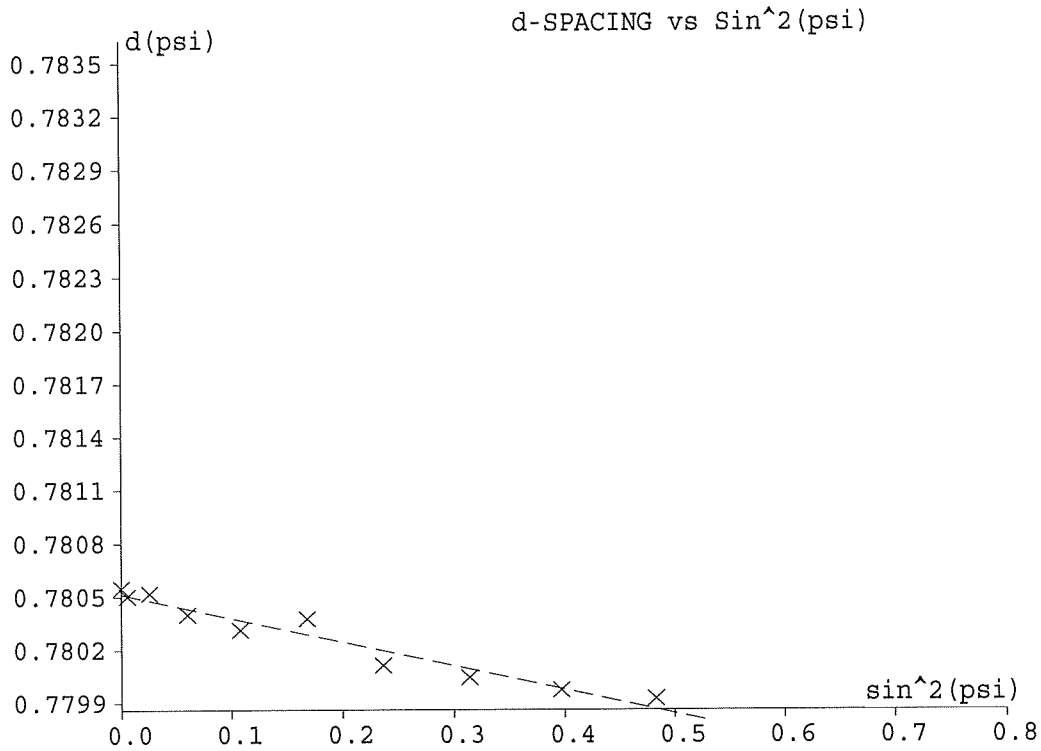
Counting Statistics Stress Error (+/-): 0.8 KSI 5.6 MPa  
Probable error.....(+/-): 1.2 KSI 8.0 MPa  
Warning: Counting statistics may be the controlling error!

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7704.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 8 / 0.15" from Hole / Longitudinal  
Circumferential with respect to Hole / ebm

*Residual Stress.....	-13.7 KSI	-94.3 MPa
Counting Statistics Stress Error (+/-):	0.8 KSI	5.6 MPa
Probable error.....(+/-):	1.2 KSI	8.0 MPa





===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7699.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 9 / 0.05" from Hole / Longitudinal  
Circumferential with respect to Hole / ebm

Acquisition date & time: 10/28/2005 3:26pm

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 20.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A 1.99867E-07 B -7.91049E-05 C 0.0688651 D 148.0028

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00010	152.73	1103.7	4.60	0.26942	161.12	0.780858	0.000046
5.0	0.00592	153.67	1179.4	4.37	0.26880	161.17	0.780794	0.000046
10.0	0.02656	154.84	1336.3	4.73	0.27132	161.24	0.780720	0.000052
15.0	0.06123	156.64	1412.4	4.05	0.26928	161.35	0.780599	0.000044
20.0	0.10846	160.03	1228.5	4.27	0.27308	161.54	0.780381	0.000062
25.0	0.16786	161.48	1132.7	4.35	0.27472	161.63	0.780289	0.000055
30.0	0.23732	162.61	1317.2	4.42	0.27611	161.69	0.780217	0.000044
35.0	0.31272	167.81	1665.2	4.16	0.27917	162.00	0.779886	0.000048
40.0	0.39737	165.20	989.1	4.17	0.27679	161.84	0.780050	0.000050
45.0	0.48017	172.55	916.2	4.28	0.28426	162.27	0.779591	0.000045

Fitted Delta D vs Sin^2(psi) Data:

D Spacing Intercept.....: 0.780760  
Slope of Fitted Line.....: -0.002345  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -23.9 KSI -165.0 MPa

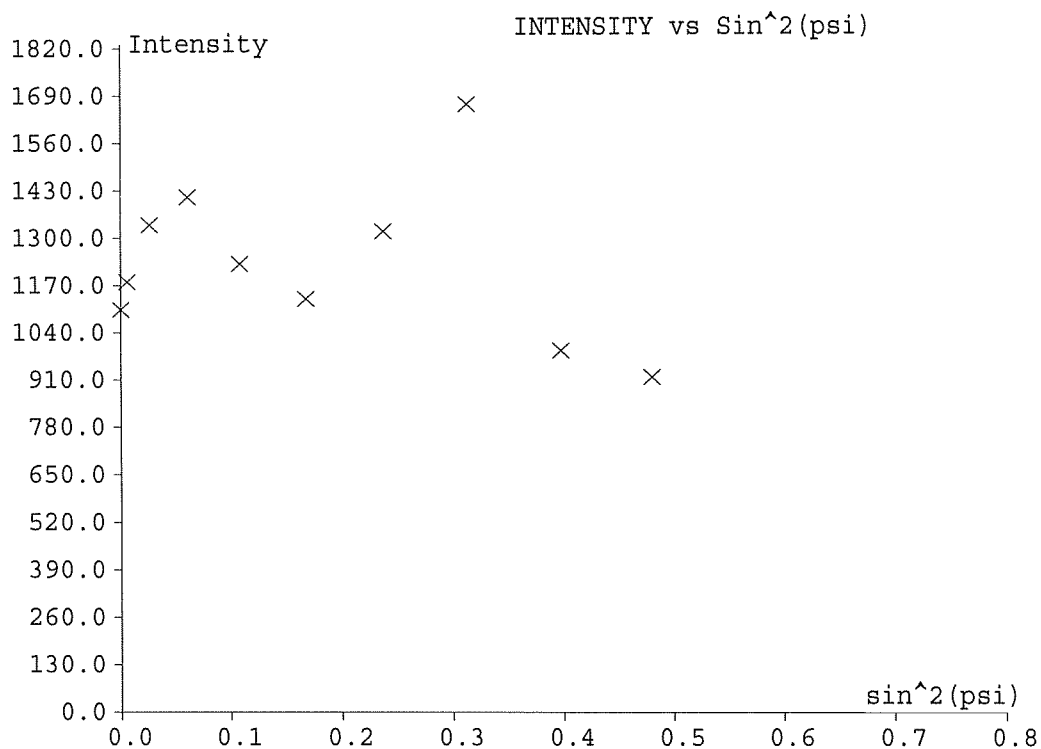
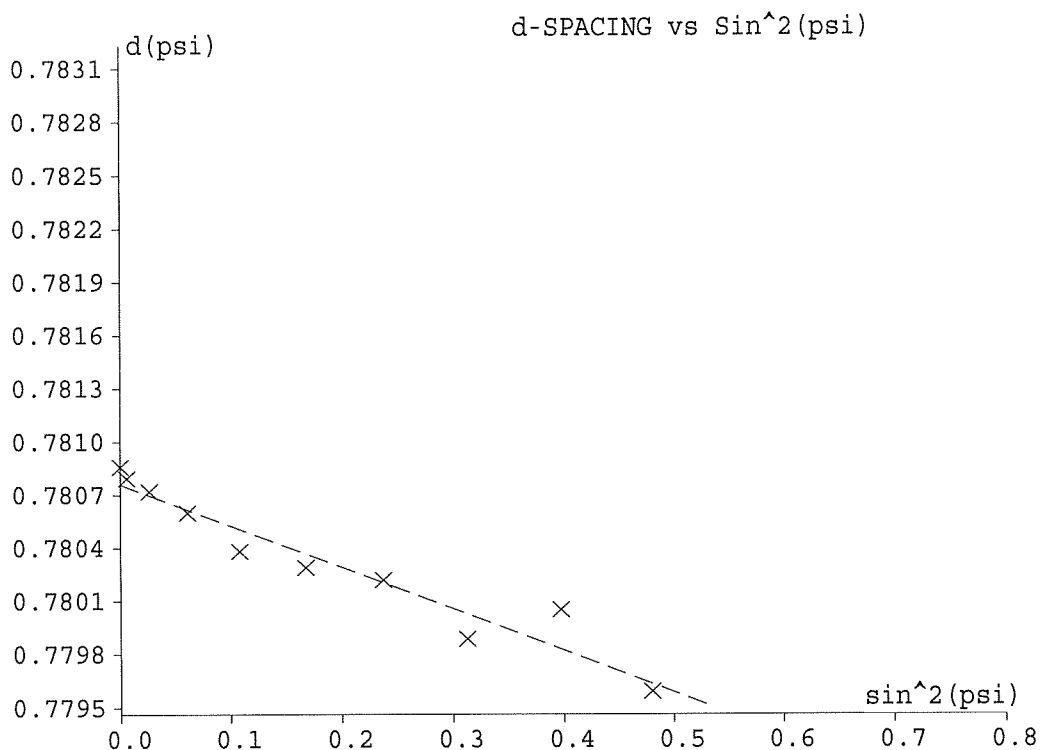
Counting Statistics Stress Error (+/-): 0.9 KSI 6.5 MPa  
Probable error.....(+/-): 2.3 KSI 15.7 MPa

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7699.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 9 / 0.05" from Hole / Longitudinal  
Circumferential with respect to Hole / ebm

*Residual Stress.....:	-23.9 KSI	-165.0 MPa
Counting Statistics Stress Error (+/-):	0.9 KSI	6.5 MPa
Probable error.....(+/-):	2.3 KSI	15.7 MPa



===== TEC Stress Analyzer v1.64 =====  
 ===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7700.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 9 / 0.10" from Hole / Longitudinal  
 Circumferential with respect to Hole / ebm

Acquisition date & time: 10/28/2005 3:31pm

Material [hkl].....: Al 5083-H23 [333]  
 Depth.....: 0.0000000  
 Phi angle.....: 0.00  
 Collimator.....: Round\_4mm  
 Bracket.....: 160s  
 Peak Bounding Range [percent].....: 20  
 X-ray Target Description and Wavelength: copper 1.54056  
 PSI Oscillation Angle Range.....: 2.00  
 Spectra count time (PSI=0).....: 20.0  
 High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
 ADC Channels Full Scale.....: 256  
 Detector Calibration Coefficients:  
 A 1.99867E-07 B -7.91049E-05 C 0.0688651 D 148.0028

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00019	160.76	1153.5	4.56	0.27558	161.58	0.780337	0.000044
5.0	0.00562	157.55	1403.7	4.08	0.27013	161.40	0.780540	0.000047
10.0	0.02563	160.62	1271.4	4.54	0.27533	161.58	0.780345	0.000055
15.0	0.06065	159.00	1452.9	3.86	0.27025	161.49	0.780445	0.000037
20.0	0.10785	161.93	1714.3	3.82	0.27226	161.66	0.780257	0.000033
25.0	0.16791	161.32	1304.8	3.97	0.27250	161.62	0.780297	0.000033
30.0	0.23692	163.50	1280.0	4.04	0.27457	161.75	0.780158	0.000036
35.0	0.31359	165.95	1926.7	3.94	0.27634	161.89	0.780002	0.000029
40.0	0.39875	162.38	1382.3	3.81	0.27250	161.68	0.780228	0.000024
45.0	0.48303	166.93	1084.8	4.16	0.27837	161.95	0.779941	0.000045

Fitted Delta D vs Sin^2(psi) Data:

D Spacing Intercept.....: 0.780418  
 Slope of Fitted Line.....: -0.0009065  
 Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -9.3 KSI -63.8 MPa

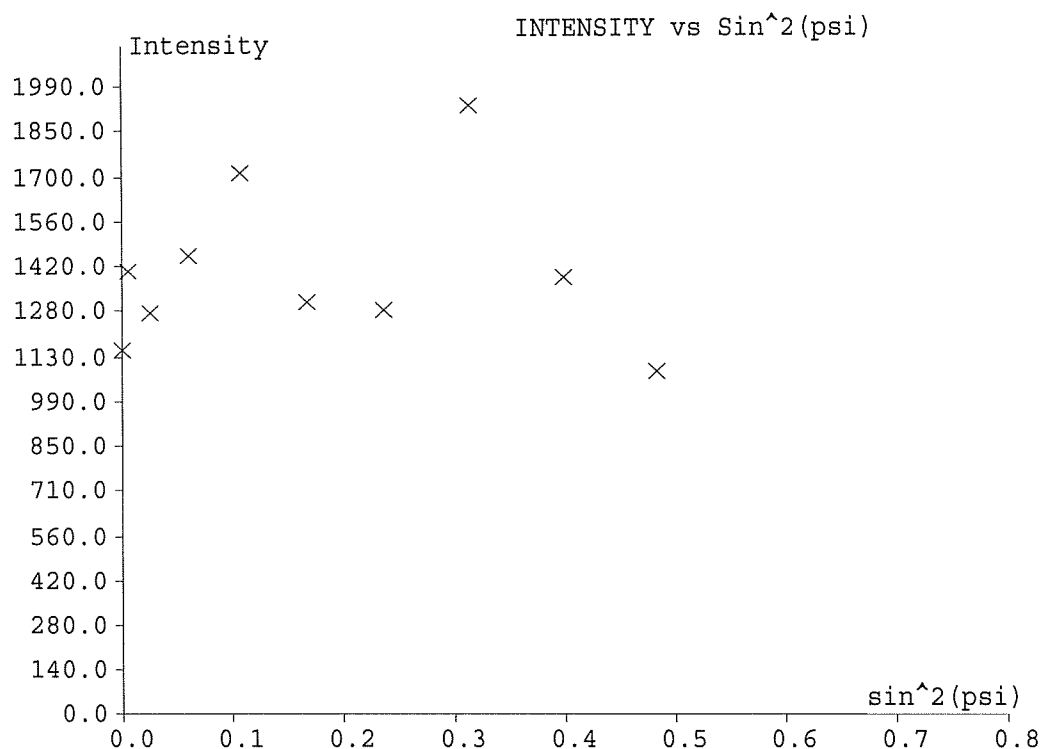
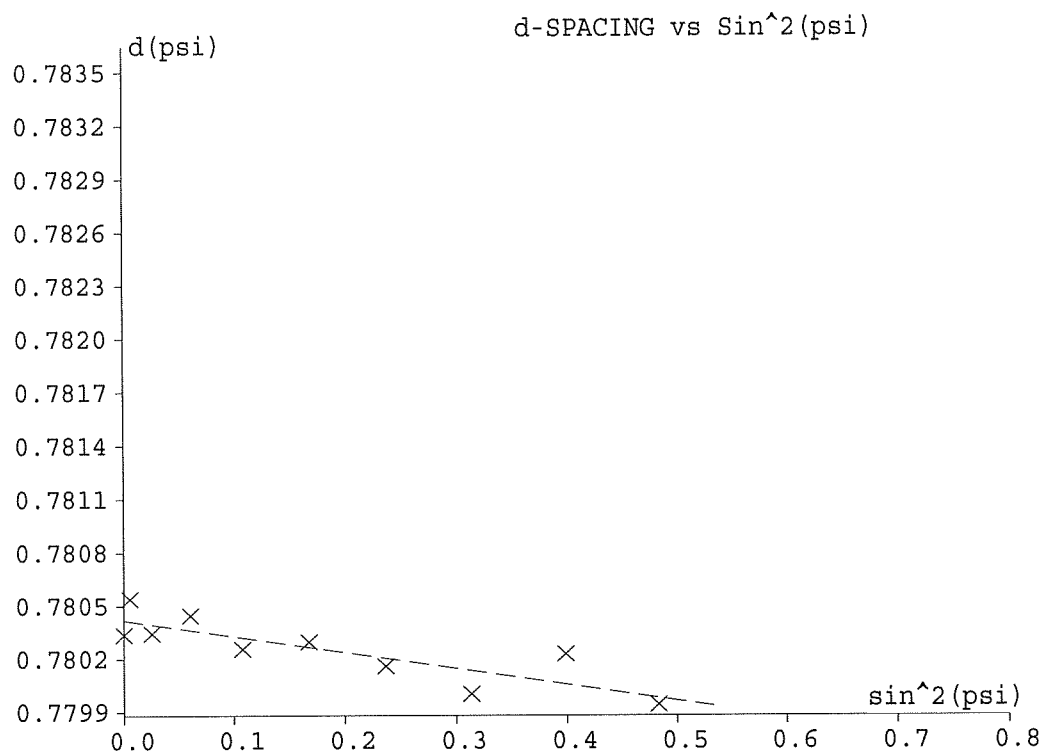
Counting Statistics Stress Error (+/-): 0.8 KSI 5.7 MPa  
 Probable error.....(+/-): 2.1 KSI 14.2 MPa

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7700.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 9 / 0.10" from Hole / Longitudinal  
Circumferential with respect to Hole / ebm

*Residual Stress.....:	-9.3 KSI	-63.8 MPa
Counting Statistics Stress Error (+/-):	0.8 KSI	5.7 MPa
Probable error.....(+/-):	2.1 KSI	14.2 MPa



===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7701.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 9 / 0.15" from Hole / Longitudinal  
Circumferential with respect to Hole / ebm

Acquisition date & time: 10/28/2005 3:36pm

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 20.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A 1.99867E-07 B -7.91049E-05 C 0.0688651 D 148.0028

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp	Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00023	163.46	1231.3	4.04	0.27452		161.74	0.780160	0.000040
5.0	0.00519	163.36	1243.7	3.72	0.27263		161.74	0.780165	0.000031
10.0	0.02527	162.82	1089.4	4.00	0.27382		161.71	0.780201	0.000039
15.0	0.05978	162.62	1542.6	3.80	0.27261		161.70	0.780213	0.000027
20.0	0.10683	165.18	1569.0	4.04	0.27614		161.84	0.780051	0.000030
25.0	0.16774	161.77	1313.9	3.97	0.27287		161.65	0.780268	0.000034
30.0	0.23765	161.80	1623.2	3.86	0.27235		161.65	0.780266	0.000032
35.0	0.31372	165.69	1706.2	4.15	0.27716		161.87	0.780020	0.000039
40.0	0.39841	163.05	1687.5	3.61	0.27154		161.72	0.780184	0.000023
45.0	0.48379	165.42	1030.6	4.08	0.27655		161.86	0.780036	0.000035

Fitted Delta D vs Sin^2(psi) Data:

D Spacing Intercept.....: 0.780191  
Slope of Fitted Line.....: -0.0001943  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -2.0 KSI -13.7 MPa

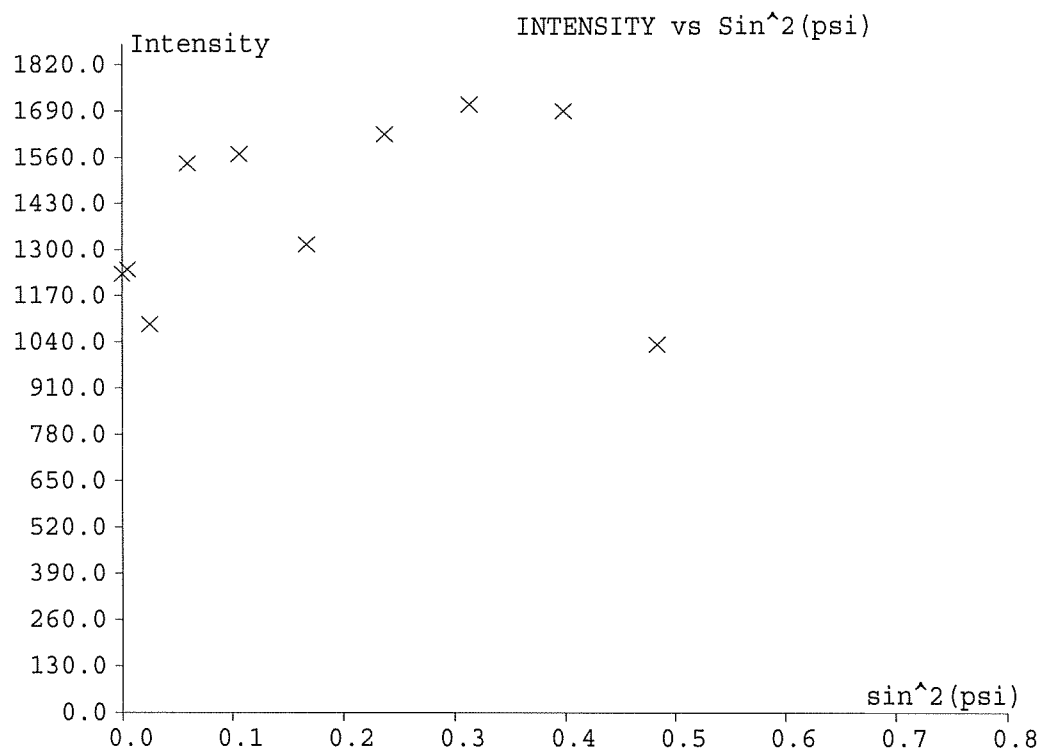
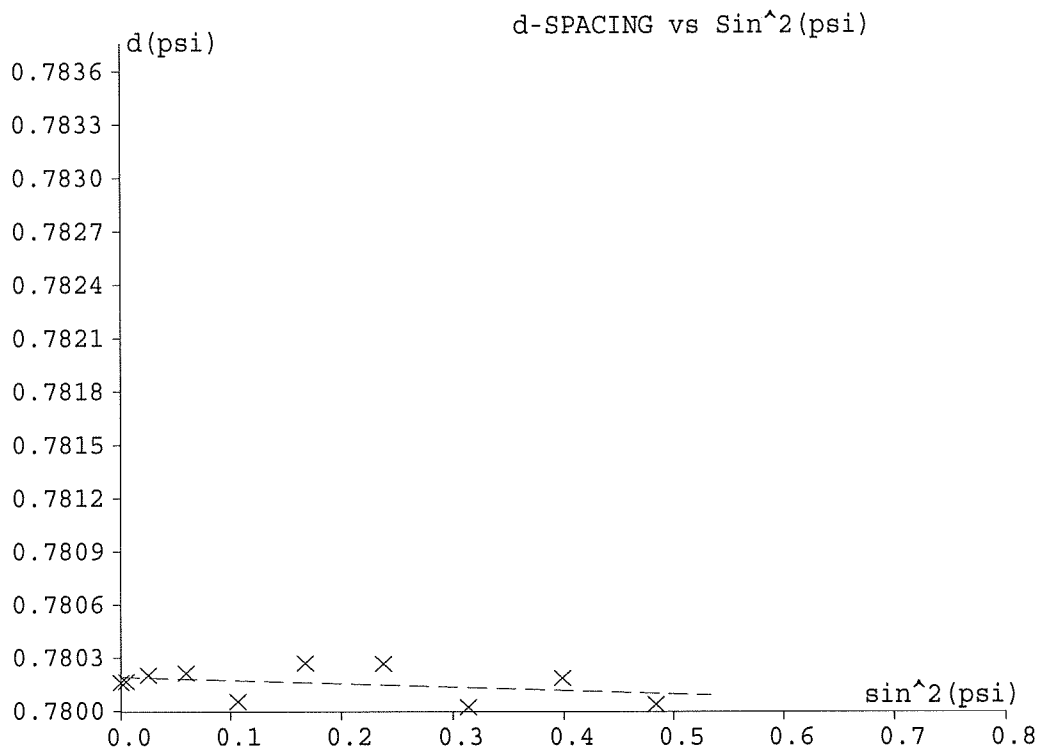
Counting Statistics Stress Error (+/-): 0.7 KSI 4.6 MPa  
Probable error.....(+/-): 1.8 KSI 12.2 MPa

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7701.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 9 / 0.15" from Hole / Longitudinal  
Circumferential with respect to Hole / ebm

*Residual Stress.....:	-2.0 KSI	-13.7 MPa
Counting Statistics Stress Error (+/-):	0.7 KSI	4.6 MPa
Probable error.....(+/-):	1.8 KSI	12.2 MPa



===== TEC Stress Analyzer v1.64 =====  
 ===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7696.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 10 / 0.05" from Hole / Longitudinal  
 Circumferential with respect to Hole / ebm

Acquisition date & time: 10/28/2005 3:08pm

Material [hkl].....: Al 5083-H23 [333]  
 Depth.....: 0.0000000  
 Phi angle.....: 0.00  
 Collimator.....: Round\_4mm  
 Bracket.....: 160s  
 Peak Bounding Range [percent].....: 20  
 X-ray Target Description and Wavelength: copper 1.54056  
 PSI Oscillation Angle Range.....: 2.00  
 Spectra count time (PSI=0).....: 20.0  
 High Voltage(kV) and Beam Current(mA)... 45.00 1.50  
 ADC Channels Full Scale.....: 256  
 Detector Calibration Coefficients:  
 A 1.99867E-07 B -7.91049E-05 C 0.0688651 D 148.0028

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00008	150.76	1226.2	4.69	0.26802	161.00	0.780987	0.000063
5.0	0.00633	148.55	1266.0	4.76	0.26637	160.88	0.781134	0.000054
10.0	0.02759	148.60	1443.4	4.59	0.26614	160.88	0.781130	0.000041
15.0	0.06144	155.83	1088.2	4.61	0.27188	161.30	0.780656	0.000050
20.0	0.10924	157.57	1250.7	4.41	0.27206	161.40	0.780541	0.000064
25.0	0.16734	162.88	1113.8	4.57	0.27733	161.71	0.780201	0.000065
30.0	0.23811	160.77	1461.7	4.28	0.27374	161.59	0.780334	0.000042
35.0	0.31304	167.16	1298.3	4.27	0.27920	161.96	0.779928	0.000054
40.0	0.39306	173.87	1034.8	4.28	0.28552	162.35	0.779509	0.000047
45.0	0.47677	179.24	736.9	4.63	0.29206	162.66	0.779181	0.000054

Fitted Delta D vs Sin^2(psi) Data:

D Spacing Intercept.....: 0.781051  
 Slope of Fitted Line.....: -0.003855  
 Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -39.3 KSI -271.2 MPa

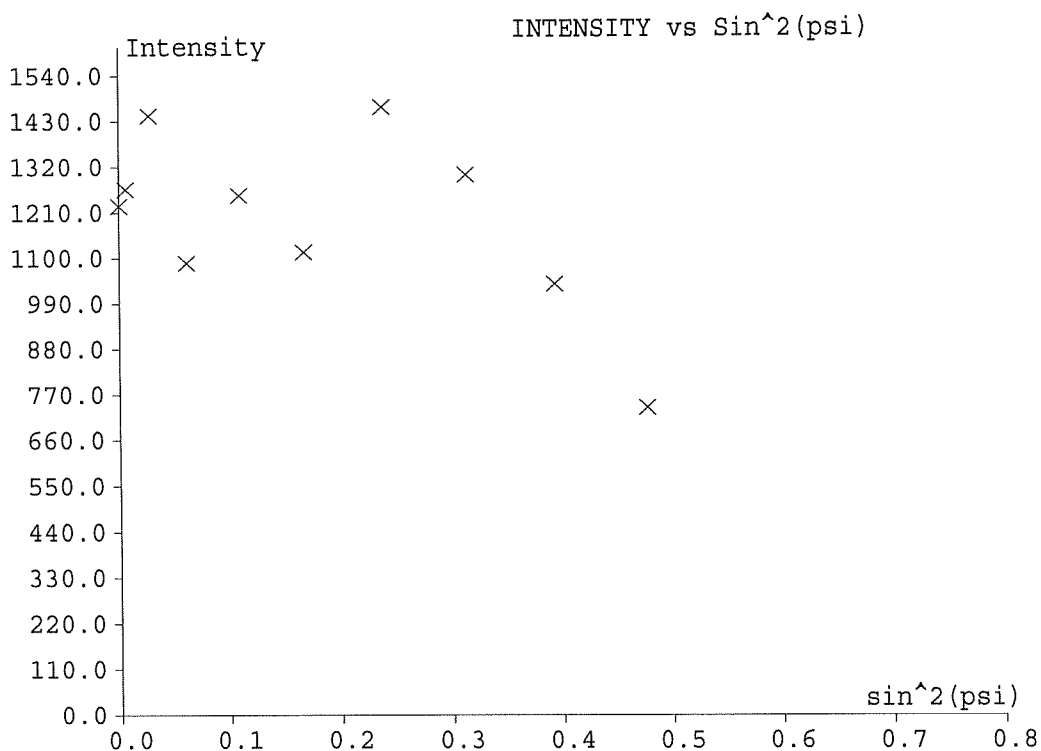
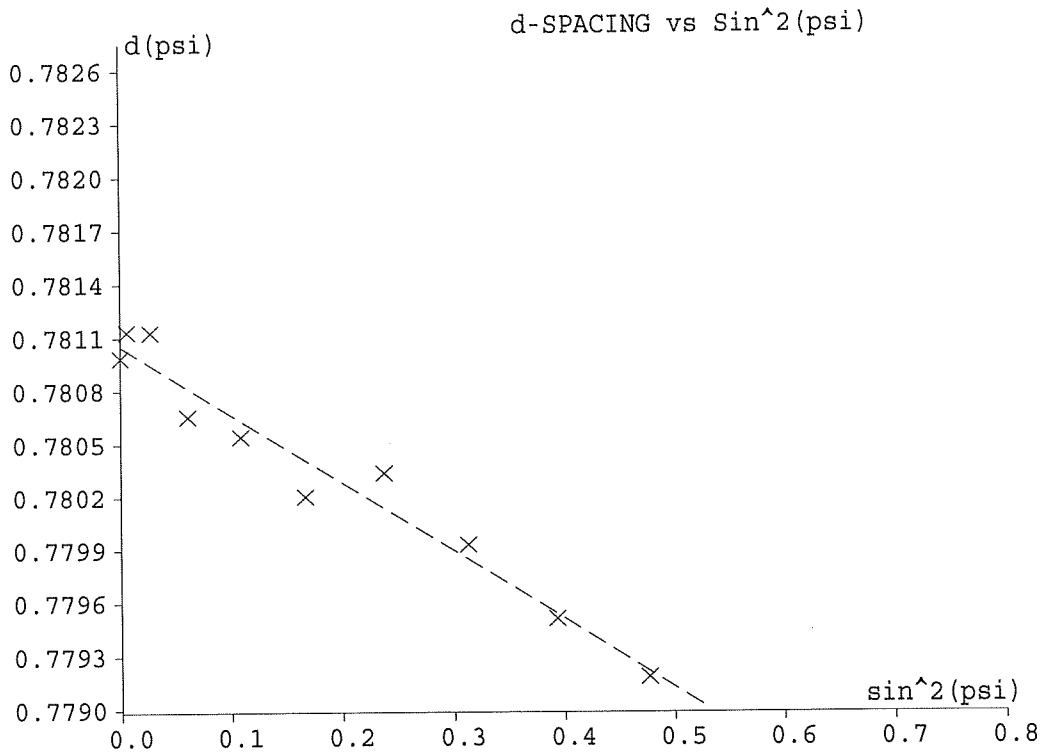
Counting Statistics Stress Error (+/-): 1.1 KSI 7.3 MPa  
 Probable error.....(+/-): 3.0 KSI 20.4 MPa

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7696.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 10 / 0.05" from Hole / Longitudinal  
Circumferential with respect to Hole / ebm

*Residual Stress.....:	-39.3 KSI	-271.2 MPa
Counting Statistics Stress Error (+/-):	1.1 KSI	7.3 MPa
Probable error.....(+/-):	3.0 KSI	20.4 MPa





===== TEC Stress Analyzer v1.64 =====  
 ===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7697.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 10 / 0.10" from Hole / Longitudinal  
 Circumferential with respect to Hole / ebm

Acquisition date & time: 10/28/2005 3:13pm

Material [hkl].....: Al 5083-H23 [333]  
 Depth.....: 0.0000000  
 Phi angle.....: 0.00  
 Collimator.....: Round\_4mm  
 Bracket.....: 160s  
 Peak Bounding Range [percent].....: 20  
 X-ray Target Description and Wavelength: copper 1.54056  
 PSI Oscillation Angle Range.....: 2.00  
 Spectra count time (PSI=0).....: 20.0  
 High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
 ADC Channels Full Scale.....: 256  
 Detector Calibration Coefficients:  
 A 1.99867E-07 B -7.91049E-05 C 0.0688651 D 148.0028

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00010	153.05	1182.9	4.65	0.26976	161.14	0.780837	0.000067
5.0	0.00614	150.93	1233.1	4.47	0.26731	161.01	0.780976	0.000043
10.0	0.02649	155.31	1372.1	4.54	0.27119	161.27	0.780689	0.000065
15.0	0.06135	156.16	1410.3	4.38	0.27081	161.32	0.780632	0.000045
20.0	0.10937	157.16	1365.2	4.33	0.27125	161.38	0.780567	0.000041
25.0	0.16887	158.78	1263.3	4.18	0.27153	161.47	0.780461	0.000047
30.0	0.23770	161.71	1529.8	4.14	0.27360	161.64	0.780273	0.000038
35.0	0.31391	165.28	1575.7	4.14	0.27671	161.85	0.780045	0.000049
40.0	0.39645	167.05	1409.7	4.13	0.27833	161.95	0.779934	0.000035
45.0	0.48253	167.90	986.4	4.09	0.27889	162.00	0.779880	0.000041

Fitted Delta D vs Sin^2(psi) Data:

D Spacing Intercept.....: 0.780821  
 Slope of Fitted Line.....: -0.002174  
 Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -22.2 KSI -153.0 MPa

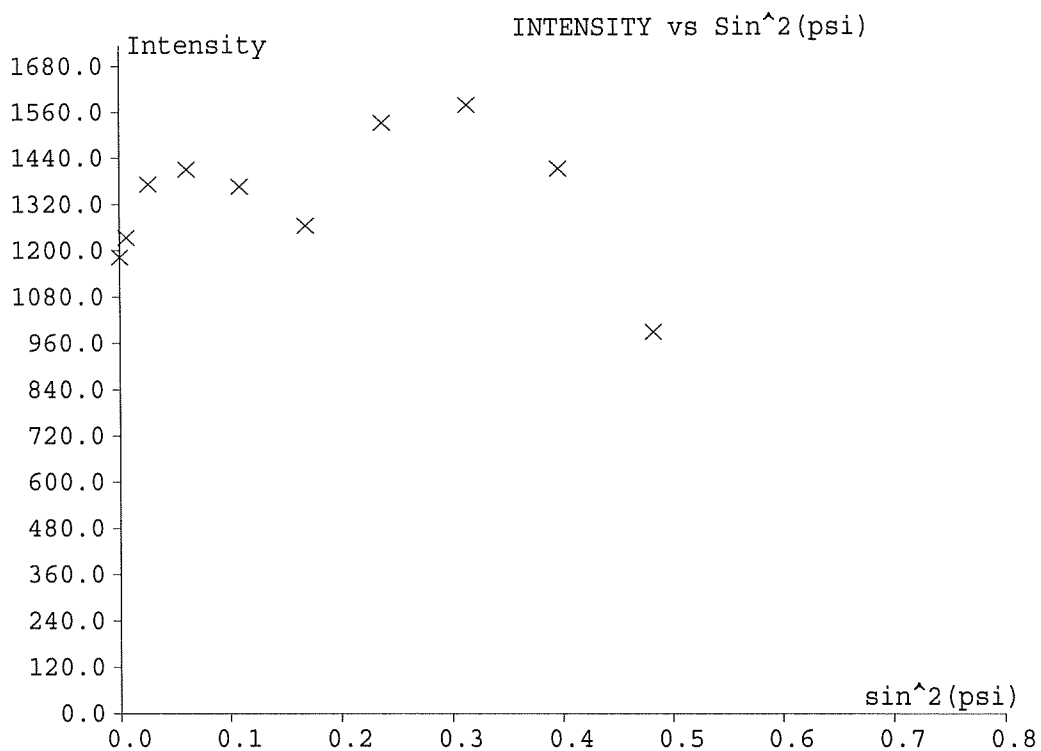
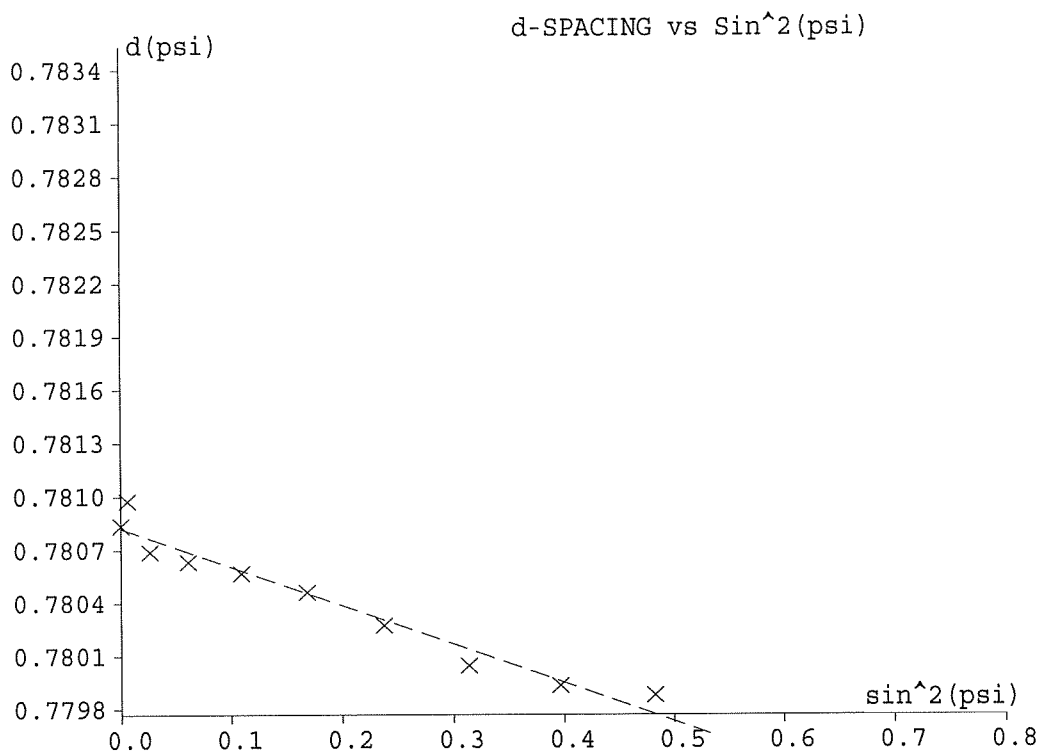
Counting Statistics Stress Error (+/-): 0.9 KSI 6.5 MPa  
 Probable error.....(+/-): 1.7 KSI 11.8 MPa  
 Warning: Counting statistics may be the controlling error!

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7697.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 10 / 0.10" from Hole / Longitudinal  
Circumferential with respect to Hole / ebm

*Residual Stress.....:	-22.2 KSI	-153.0 MPa
Counting Statistics Stress Error (+/-):	0.9 KSI	6.5 MPa
Probable error.....(+/-):	1.7 KSI	11.8 MPa



===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7698.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 10 / 0.15" from Hole / Longitudinal  
Circumferential with respect to Hole / ebm

Acquisition date & time: 10/28/2005 3:18pm

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 20.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A 1.99867E-07 B -7.91049E-05 C 0.0688651 D 148.0028

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00014	157.13	1257.2	4.43	0.27188	161.37	0.780570	0.000041
5.0	0.00567	156.90	1191.3	4.46	0.27190	161.36	0.780585	0.000049
10.0	0.02611	157.59	1530.9	4.32	0.27151	161.40	0.780539	0.000048
15.0	0.06101	157.52	1347.4	4.17	0.27054	161.40	0.780542	0.000053
20.0	0.10850	159.92	1375.0	4.33	0.27340	161.54	0.780389	0.000055
25.0	0.16883	158.90	1385.3	4.04	0.27098	161.48	0.780453	0.000040
30.0	0.23789	161.24	1685.0	3.95	0.27236	161.62	0.780301	0.000030
35.0	0.31403	165.01	1806.1	3.91	0.27535	161.83	0.780062	0.000027
40.0	0.39719	165.55	1284.2	3.91	0.27584	161.87	0.780028	0.000033
45.0	0.48273	167.50	982.5	4.10	0.27859	161.98	0.779905	0.000033

Fitted Delta D vs Sin^2(psi) Data:

D Spacing Intercept.....: 0.780596  
Slope of Fitted Line.....: -0.001438  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -14.7 KSI -101.2 MPa

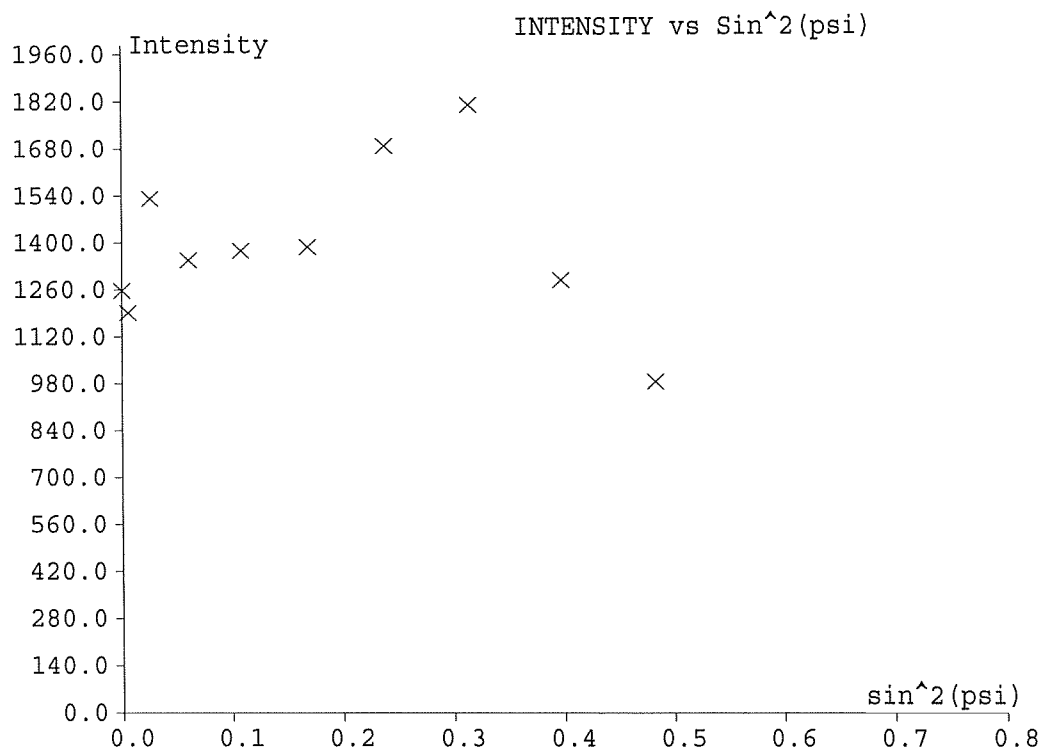
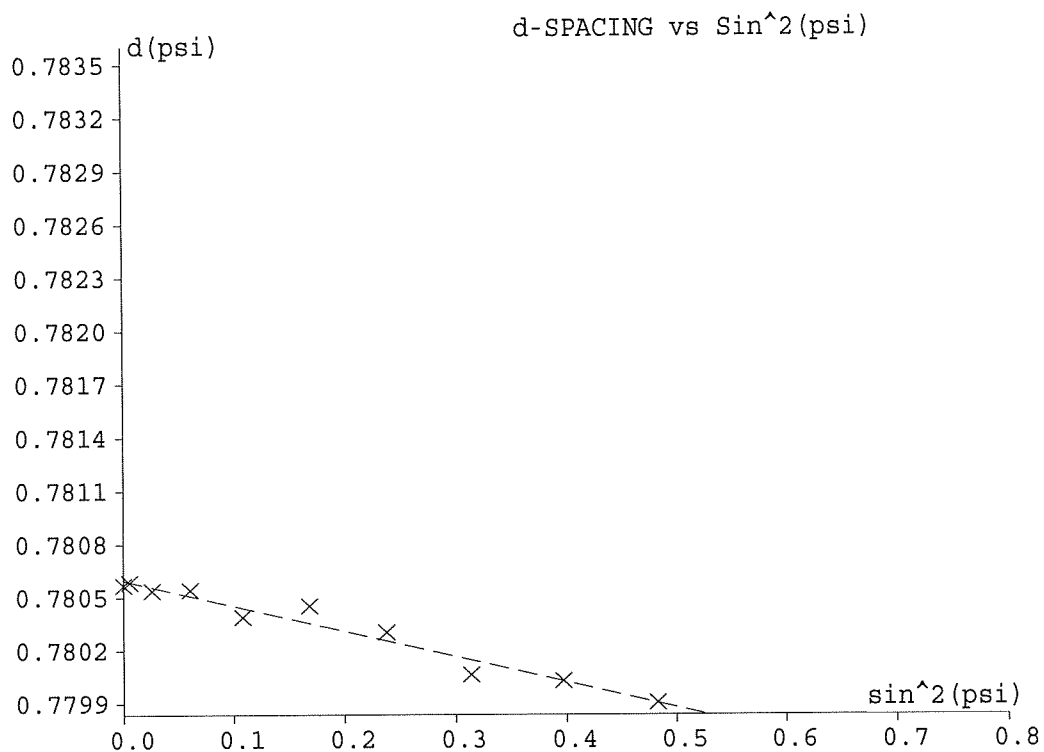
Counting Statistics Stress Error (+/-): 0.8 KSI 5.3 MPa  
Probable error.....(+/-): 1.1 KSI 7.4 MPa  
Warning: Counting statistics may be the controlling error!

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7698.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 10 / 0.15" from Hole / Longitudinal  
Circumferential with respect to Hole / ebm

*Residual Stress.....:	-14.7 KSI	-101.2 MPa
Counting Statistics Stress Error (+/-):	0.8 KSI	5.3 MPa
Probable error.....(+/-):	1.1 KSI	7.4 MPa



===== TEC Stress Analyzer v1.64 =====  
 ===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7693.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 11 / 0.05" from Hole / Longitudinal  
 Circumferential with respect to Hole / ebm

Acquisition date & time: 10/28/2005 2:52pm

Material [hkl].....: Al 5083-H23 [333]  
 Depth.....: 0.0000000  
 Phi angle.....: 0.00  
 Collimator.....: Round\_4mm  
 Bracket.....: 160s  
 Peak Bounding Range [percent].....: 20  
 X-ray Target Description and Wavelength: copper 1.54056  
 PSI Oscillation Angle Range.....: 2.00  
 Spectra count time (PSI=0).....: 20.0  
 High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
 ADC Channels Full Scale.....: 256  
 Detector Calibration Coefficients:  
 A 1.99867E-07 B -7.91049E-05 C 0.0688651 D 148.0028

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp	Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00008	151.36	913.1	5.04	0.26906		161.04	0.780948	0.000075
5.0	0.00665	144.56	1187.9	4.85	0.26331		160.65	0.781400	0.000061
10.0	0.02780	147.32	1617.1	4.73	0.26535		160.80	0.781215	0.000050
15.0	0.06201	153.50	1200.9	4.85	0.27046		161.16	0.780808	0.000070
20.0	0.10912	158.00	1056.9	4.87	0.27410		161.42	0.780515	0.000080
25.0	0.16879	159.06	988.4	4.53	0.27406		161.49	0.780446	0.000071
30.0	0.23637	164.84	1043.3	4.68	0.27937		161.82	0.780077	0.000056
35.0	0.31280	167.69	1264.6	4.53	0.28129		161.99	0.779896	0.000050
40.0	0.39273	174.54	890.7	4.41	0.28679		162.39	0.779469	0.000047
45.0	0.47791	177.00	663.2	4.54	0.28963		162.53	0.779318	0.000059

Fitted Delta D vs Sin^2(psi) Data:

D Spacing Intercept.....: 0.781141  
 Slope of Fitted Line.....: -0.00408  
 Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -41.6 KSI -287.0 MPa

Counting Statistics Stress Error (+/-): 1.2 KSI 8.2 MPa  
 Probable error.....(+/-): 3.4 KSI 23.2 MPa

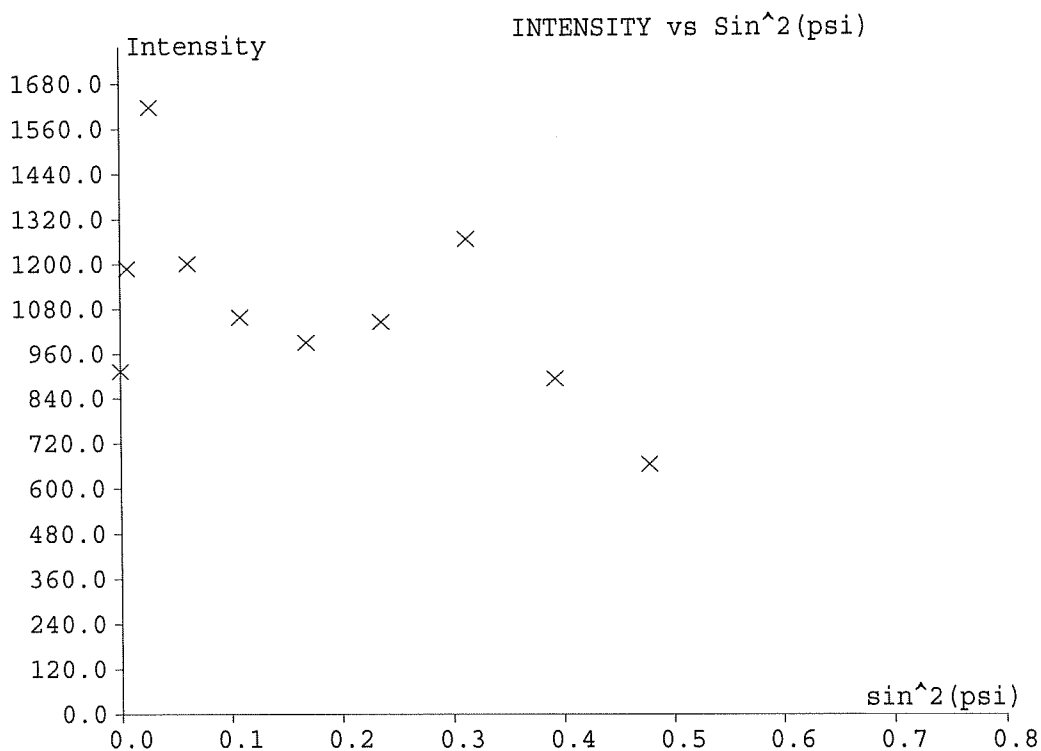
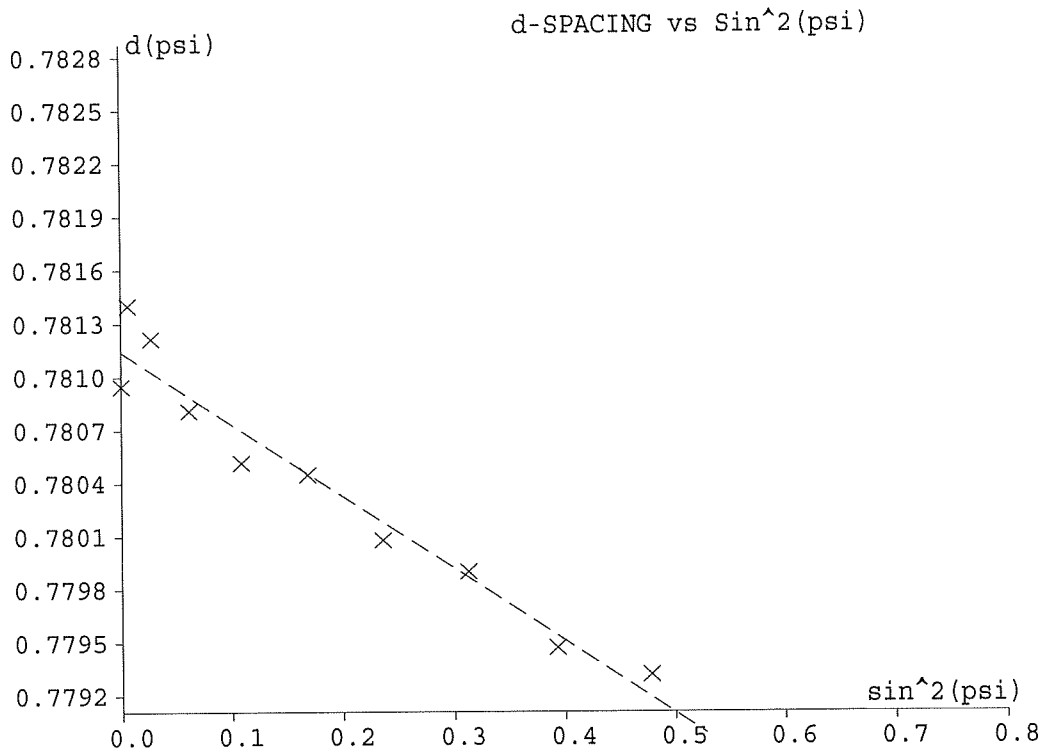
File: C:\STRESS\DATA\2143\2005\SBIR\50632\7693.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 11 / 0.05" from Hole / Longitudinal

Circumferential with respect to Hole / ebm

*Residual Stress.....:	-41.6 KSI	-287.0 MPa
Counting Statistics Stress Error (+/-):	1.2 KSI	8.2 MPa
Probable error.....(+/-):	3.4 KSI	23.2 MPa



===== TEC Stress Analyzer v1.64 =====  
 ===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7694.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 11 / 0.10" from Hole / Longitudinal  
 Circumferential with respect to Hole / ebm

Acquisition date & time: 10/28/2005 2:57pm

Material [hkl].....: Al 5083-H23 [333]  
 Depth.....: 0.0000000  
 Phi angle.....: 0.00  
 Collimator.....: Round\_4mm  
 Bracket.....: 160s  
 Peak Bounding Range [percent].....: 20  
 X-ray Target Description and Wavelength: copper 1.54056  
 PSI Oscillation Angle Range.....: 2.00  
 Spectra count time (PSI=0).....: 20.0  
 High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
 ADC Channels Full Scale.....: 256  
 Detector Calibration Coefficients:  
 A 1.99867E-07 B -7.91049E-05 C 0.0688651 D 148.0028

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00009	152.39	1087.8	4.85	0.26956	161.10	0.780881	0.000070
5.0	0.00627	149.21	1323.7	4.76	0.26689	160.91	0.781090	0.000049
10.0	0.02691	152.68	1424.3	4.55	0.26917	161.12	0.780861	0.000048
15.0	0.06137	156.11	1276.8	5.03	0.27285	161.31	0.780638	0.000054
20.0	0.10908	158.11	1184.6	4.53	0.27330	161.43	0.780507	0.000050
25.0	0.16871	159.22	1225.3	4.19	0.27192	161.50	0.780433	0.000040
30.0	0.23692	163.53	1324.6	4.35	0.27639	161.75	0.780158	0.000039
35.0	0.31410	164.91	1536.1	4.43	0.27818	161.83	0.780071	0.000048
40.0	0.39493	170.11	1100.2	4.11	0.28104	162.13	0.779742	0.000054
45.0	0.47898	174.90	704.3	4.42	0.28713	162.41	0.779446	0.000077

Fitted Delta D vs Sin^2(psi) Data:

D Spacing Intercept.....: 0.780930  
 Slope of Fitted Line.....: -0.003044  
 Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -31.1 KSI -214.1 MPa

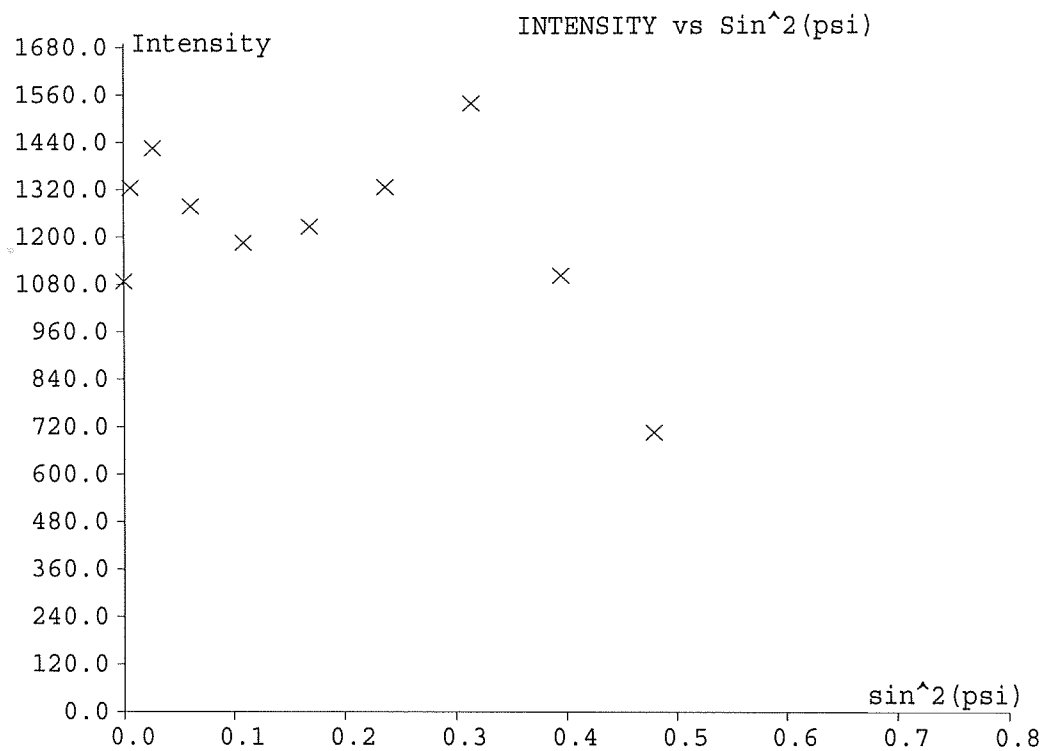
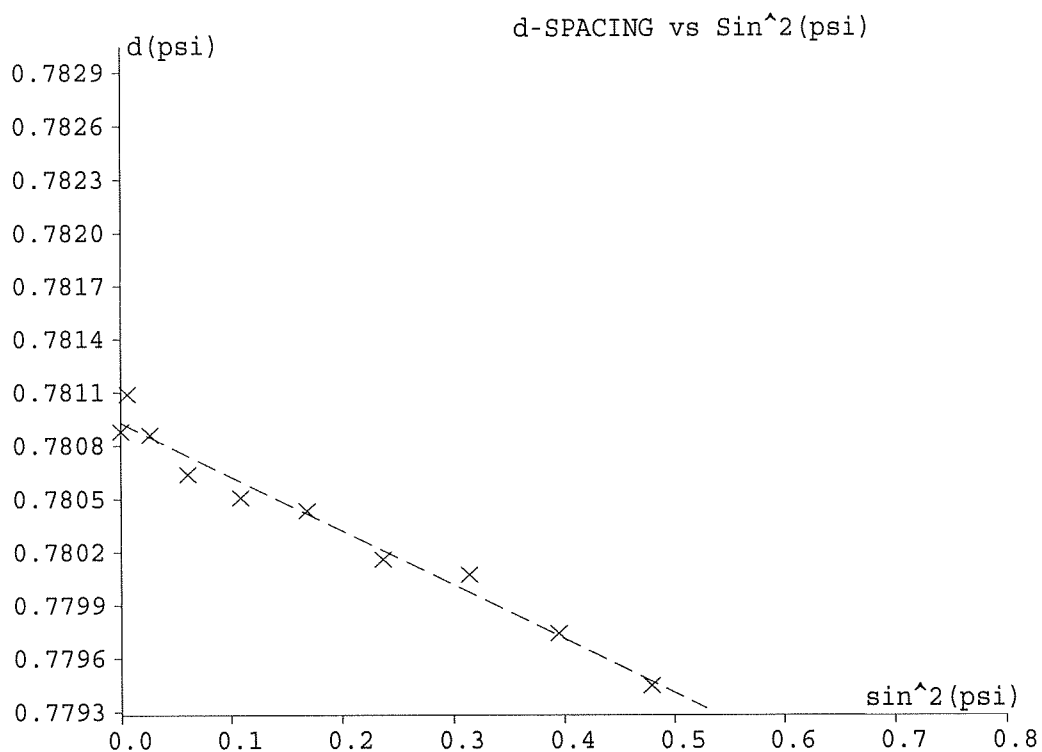
Counting Statistics Stress Error (+/-): 1.3 KSI 8.7 MPa  
 Probable error.....(+/-): 1.8 KSI 12.6 MPa  
 Warning: Counting statistics may be the controlling error!

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7694.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 11 / 0.10" from Hole / Longitudinal  
Circumferential with respect to Hole / ebm

*Residual Stress.....:	-31.1 KSI	-214.1 MPa
Counting Statistics Stress Error (+/-):	1.3 KSI	8.7 MPa
Probable error.....(+/-):	1.8 KSI	12.6 MPa





===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7695.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 11 / 0.15" from Hole / Longitudinal  
Circumferential with respect to Hole / ebm

Acquisition date & time: 10/28/2005 3:02pm

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 20.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A 1.99867E-07 B -7.91049E-05 C 0.0688651 D 148.0028

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00015	157.56	976.9	4.50	0.27267	161.40	0.780542	0.000060
5.0	0.00541	160.41	1469.0	4.59	0.27549	161.56	0.780359	0.000039
10.0	0.02618	157.18	1221.4	4.52	0.27250	161.38	0.780567	0.000046
15.0	0.06054	159.51	1391.8	4.51	0.27428	161.51	0.780416	0.000038
20.0	0.10845	160.07	1257.5	4.22	0.27278	161.55	0.780378	0.000055
25.0	0.16895	158.56	1274.8	3.82	0.26971	161.46	0.780474	0.000037
30.0	0.23770	161.68	1591.8	4.05	0.27319	161.64	0.780274	0.000030
35.0	0.31633	160.13	1882.6	3.78	0.27057	161.55	0.780372	0.000023
40.0	0.39511	169.74	1240.2	4.19	0.28117	162.11	0.779765	0.000044
45.0	0.48175	169.47	713.1	4.47	0.28255	162.09	0.779784	0.000074

Fitted Delta D vs Sin^2(psi) Data:

D Spacing Intercept.....: 0.780550  
Slope of Fitted Line.....: -0.001428  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -14.6 KSI -100.5 MPa

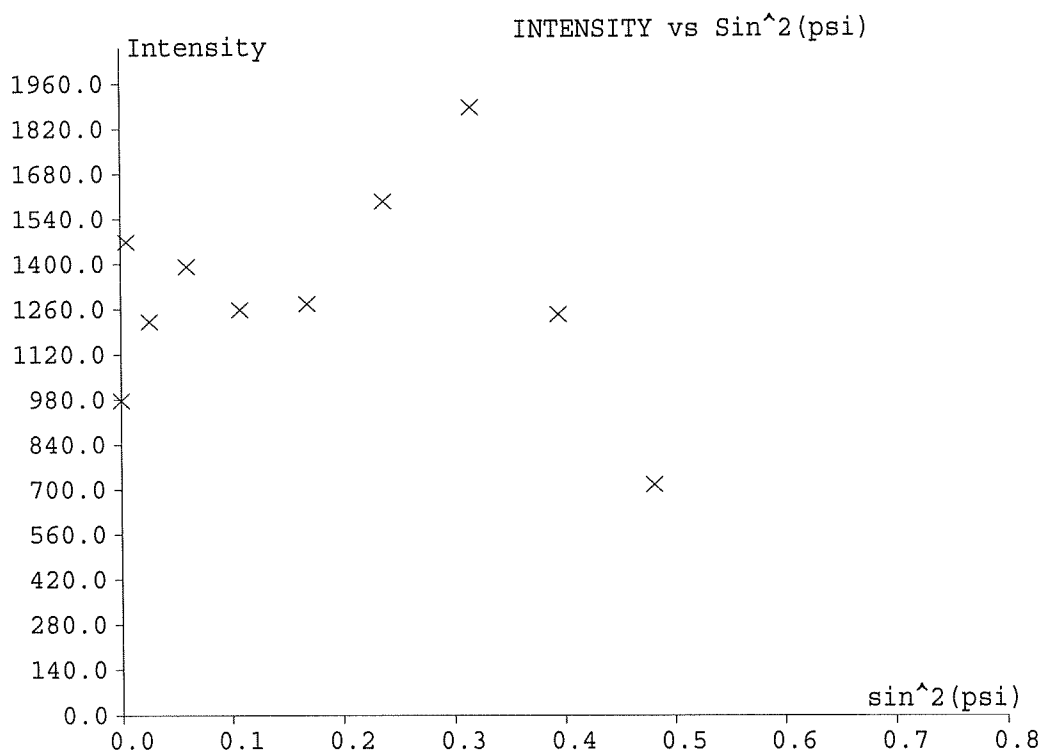
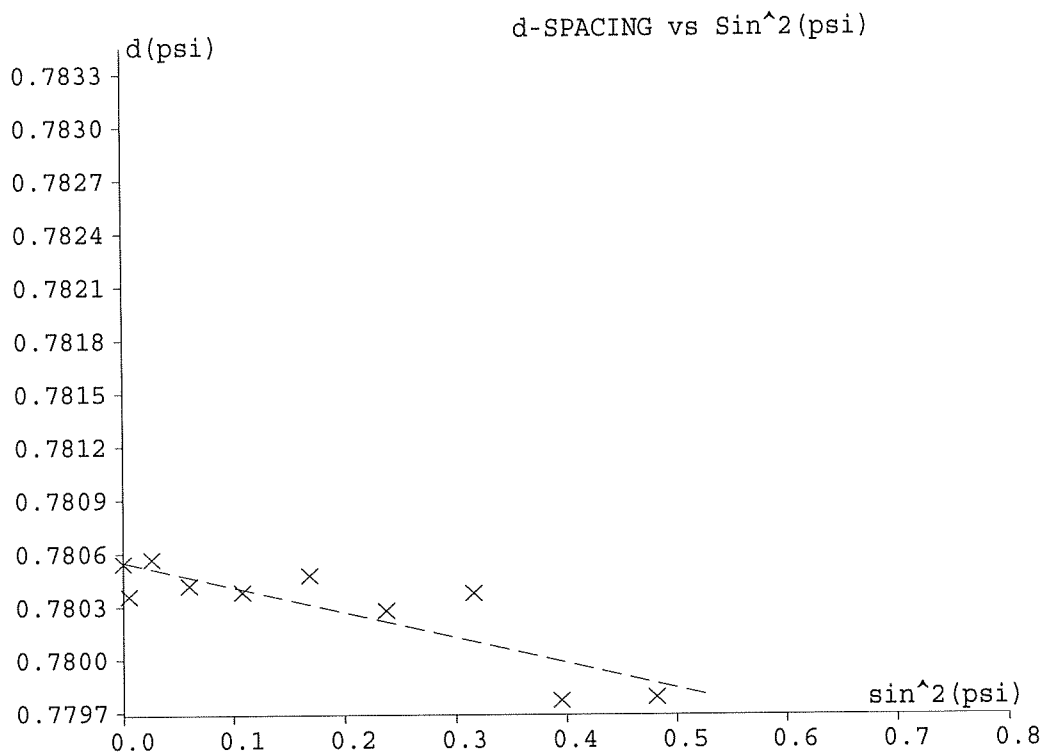
Counting Statistics Stress Error (+/-): 1.1 KSI 7.7 MPa  
Probable error.....(+/-): 3.1 KSI 21.6 MPa

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7695.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 11 / 0.15" from Hole / Longitudinal  
Circumferential with respect to Hole / ebm

*Residual Stress.....:	-14.6 KSI	-100.5 MPa
Counting Statistics Stress Error (+/-):	1.1 KSI	7.7 MPa
Probable error.....(+/-):	3.1 KSI	21.6 MPa



===== TEC Stress Analyzer v1.64 =====  
 ===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7690.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 12 / 0.05" from Hole / Longitudinal  
 Circumferential with respect to Hole / ebm

Acquisition date & time: 10/28/2005 2:35pm

Material [hkl].....: Al 5083-H23 [333]  
 Depth.....: 0.0000000  
 Phi angle.....: 0.00  
 Collimator.....: Round\_4mm  
 Bracket.....: 160s  
 Peak Bounding Range [percent].....: 20  
 X-ray Target Description and Wavelength: copper 1.54056  
 PSI Oscillation Angle Range.....: 2.00  
 Spectra count time (PSI=0).....: 20.0  
 High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
 ADC Channels Full Scale.....: 256  
 Detector Calibration Coefficients:  
 A 1.99867E-07 B -7.91049E-05 C 0.0688651 D 148.0028

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00008	151.00	979.2	5.03	0.26876	161.02	0.780972	0.000059
5.0	0.00652	146.18	1163.2	4.99	0.26484	160.74	0.781292	0.000059
10.0	0.02752	148.98	1535.3	4.75	0.26671	160.90	0.781105	0.000054
15.0	0.06172	154.66	1135.9	4.82	0.27133	161.23	0.780732	0.000073
20.0	0.10947	156.88	1006.5	5.09	0.27367	161.36	0.780588	0.000093
25.0	0.16858	159.58	1121.6	4.42	0.27374	161.52	0.780411	0.000046
30.0	0.23639	164.77	1276.0	4.40	0.27783	161.82	0.780080	0.000064
35.0	0.31207	169.24	1436.6	4.50	0.28251	162.08	0.779799	0.000042
40.0	0.39261	174.77	937.5	4.31	0.28649	162.40	0.779454	0.000045
45.0	0.47752	177.74	715.2	4.25	0.28898	162.58	0.779271	0.000047

Fitted Delta D vs Sin^2(psi) Data:

D Spacing Intercept.....: 0.781099  
 Slope of Fitted Line.....: -0.004062  
 Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -41.4 KSI -285.7 MPa

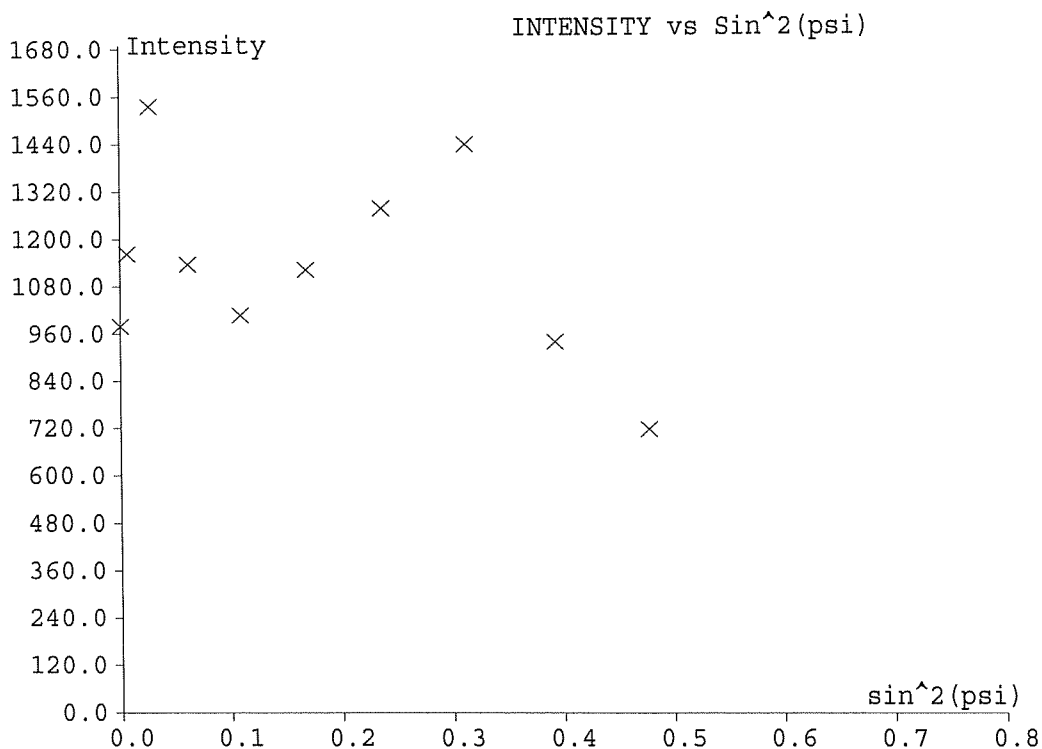
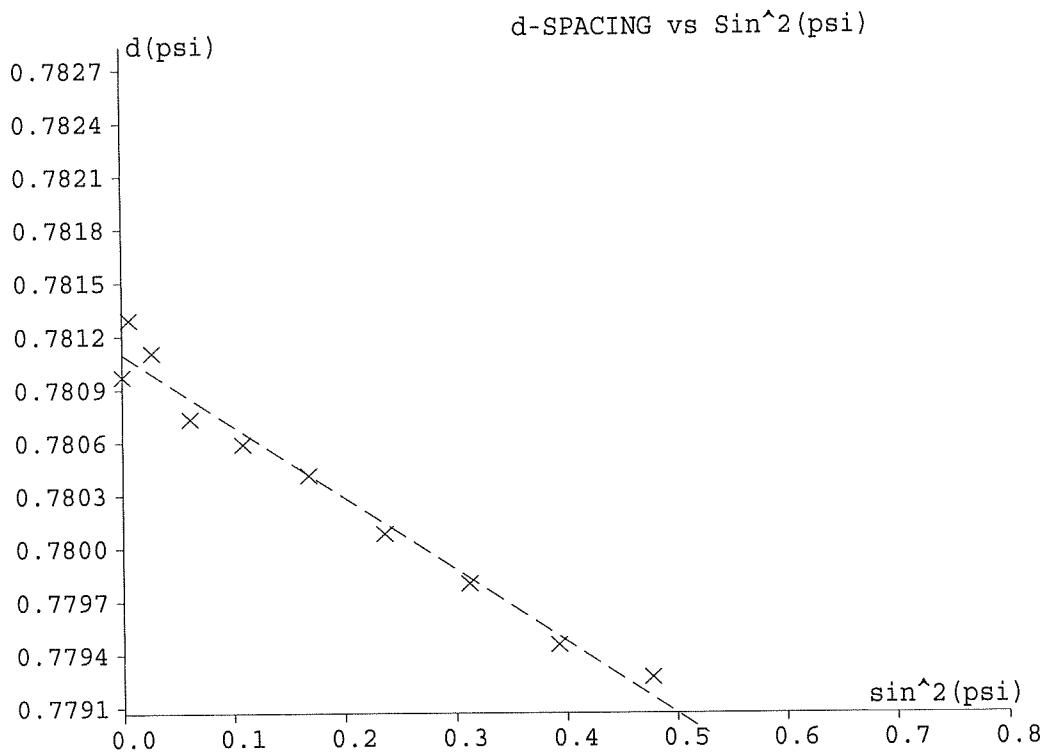
Counting Statistics Stress Error (+/-): 1.1 KSI 7.4 MPa  
 Probable error.....(+/-): 2.4 KSI 16.6 MPa

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7690.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 12 / 0.05" from Hole / Longitudinal  
Circumferential with respect to Hole / ebm

*Residual Stress.....:	-41.4 KSI	-285.7 MPa
Counting Statistics Stress Error (+/-):	1.1 KSI	7.4 MPa
Probable error.....(+/-):	2.4 KSI	16.6 MPa



===== TEC Stress Analyzer v1.64 =====  
 ===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7691.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 12 / 0.10" from Hole / Longitudinal  
 Circumferential with respect to Hole / ebm

Acquisition date & time: 10/28/2005 2:41pm

Material [hkl].....: Al 5083-H23 [333]  
 Depth.....: 0.0000000  
 Phi angle.....: 0.00  
 Collimator.....: Round\_4mm  
 Bracket.....: 160s  
 Peak Bounding Range [percent].....: 20  
 X-ray Target Description and Wavelength: copper 1.54056  
 PSI Oscillation Angle Range.....: 2.00  
 Spectra count time (PSI=0).....: 20.0  
 High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
 ADC Channels Full Scale.....: 256  
 Detector Calibration Coefficients:  
 A 1.99867E-07 B -7.91049E-05 C 0.0688651 D 148.0028

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp Cor	A	2-Theta	D Spacing	St. Dev.
0.0	0.00012	154.66	1270.9	4.65	0.27104		161.23	0.780731	0.000050
5.0	0.00616	150.60	1140.3	4.44	0.26683		161.00	0.780997	0.000052
10.0	0.02661	154.53	1333.3	4.63	0.27090		161.22	0.780740	0.000061
15.0	0.06125	156.60	1271.6	4.49	0.27187		161.34	0.780605	0.000044
20.0	0.10973	156.03	1226.1	4.50	0.27147		161.31	0.780642	0.000058
25.0	0.16889	158.76	1425.4	4.36	0.27267		161.47	0.780464	0.000041
30.0	0.23709	163.14	1693.4	4.28	0.27559		161.72	0.780182	0.000040
35.0	0.31358	165.99	1817.4	4.13	0.27735		161.89	0.780000	0.000038
40.0	0.39435	171.28	1113.3	4.31	0.28324		162.20	0.779670	0.000042
45.0	0.47776	177.25	787.7	4.05	0.28742		162.55	0.779300	0.000044

Fitted Delta D vs Sin^2(psi) Data:

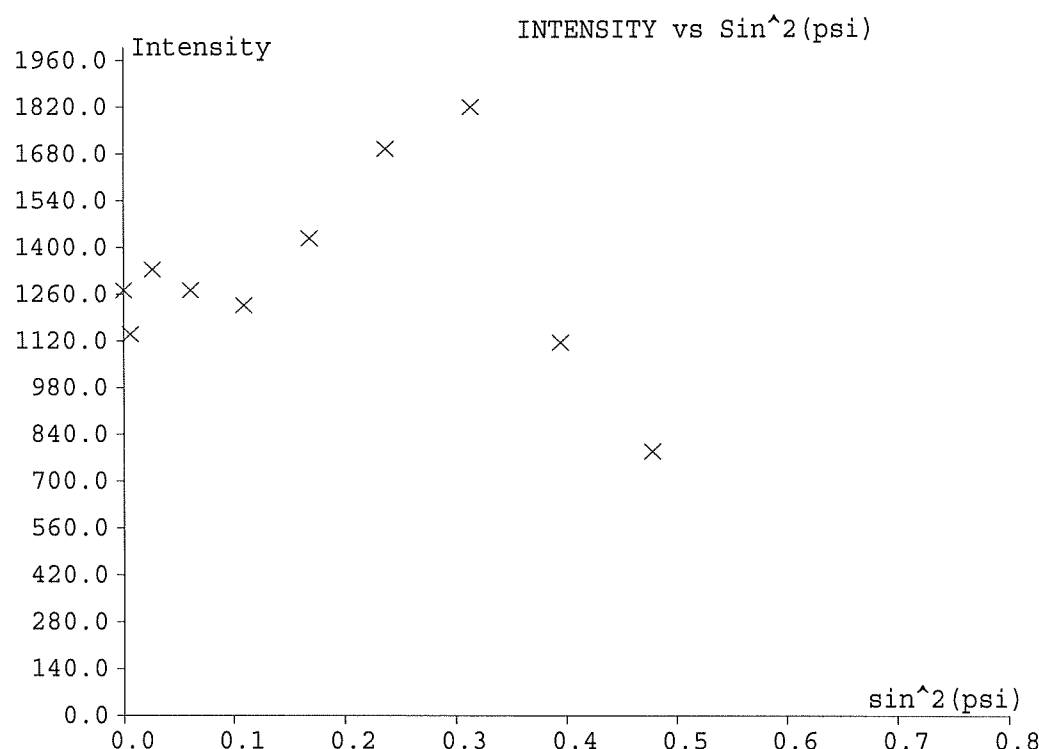
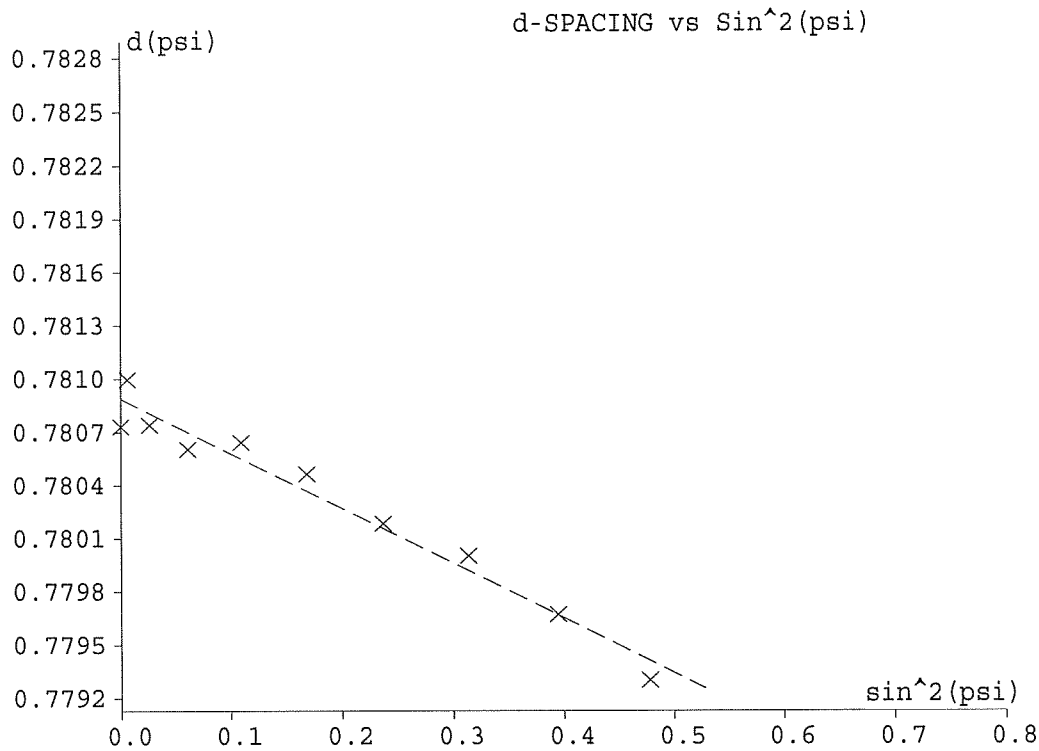
D Spacing Intercept.....: 0.780889  
 Slope of Fitted Line.....: -0.003095  
 Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -31.6 KSI -217.7 MPa

Counting Statistics Stress Error (+/-): 0.9 KSI 6.5 MPa  
 Probable error.....(+/-): 2.1 KSI 14.8 MPa

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7691.STR  
Sample Description:  
SBIR / WP / CW Holes / AF Std 12 / 0.10" from Hole / Longitudinal  
Circumferential with respect to Hole / ebm

\*Residual Stress.....: -31.6 KSI -217.7 MPa  
Counting Statistics Stress Error (+/-): 0.9 KSI 6.5 MPa  
Probable error.....(+/-): 2.1 KSI 14.8 MPa



===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7692.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 12 / 0.15" from Hole / Longitudinal  
Circumferential with respect to Hole / ebm

Acquisition date & time: 10/28/2005 2:46pm

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 20.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A 1.99867E-07 B -7.91049E-05 C 0.0688651 D 148.0028

Psi	Sin <sup>2</sup> (psi)	Pk Chan	Intens	FWHM	Kalp Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00011	154.44	1276.7	4.38	0.26942	161.22	0.780744	0.000047
5.0	0.00592	153.61	1116.6	4.20	0.26765	161.17	0.780797	0.000046
10.0	0.02602	158.16	1650.1	4.35	0.27213	161.43	0.780502	0.000038
15.0	0.06109	157.25	1271.9	4.47	0.27224	161.38	0.780562	0.000045
20.0	0.10908	158.06	1181.6	4.33	0.27197	161.43	0.780509	0.000045
25.0	0.16913	158.12	1368.7	4.20	0.27110	161.43	0.780504	0.000034
30.0	0.23780	161.48	1703.1	4.23	0.27394	161.63	0.780288	0.000038
35.0	0.31349	166.18	1909.0	4.11	0.27741	161.90	0.779988	0.000030
40.0	0.39555	168.87	1077.7	4.36	0.28135	162.06	0.779821	0.000042
45.0	0.47847	175.91	769.9	4.54	0.28868	162.47	0.779385	0.000065

Fitted Delta D vs Sin<sup>2</sup>(psi) Data:

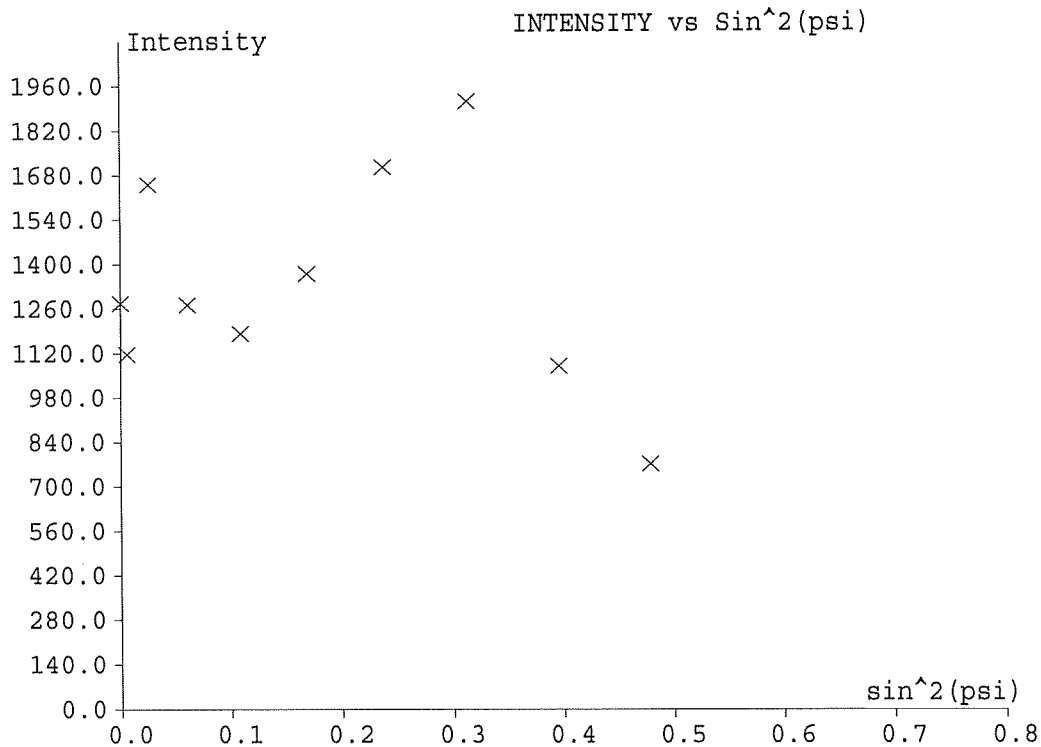
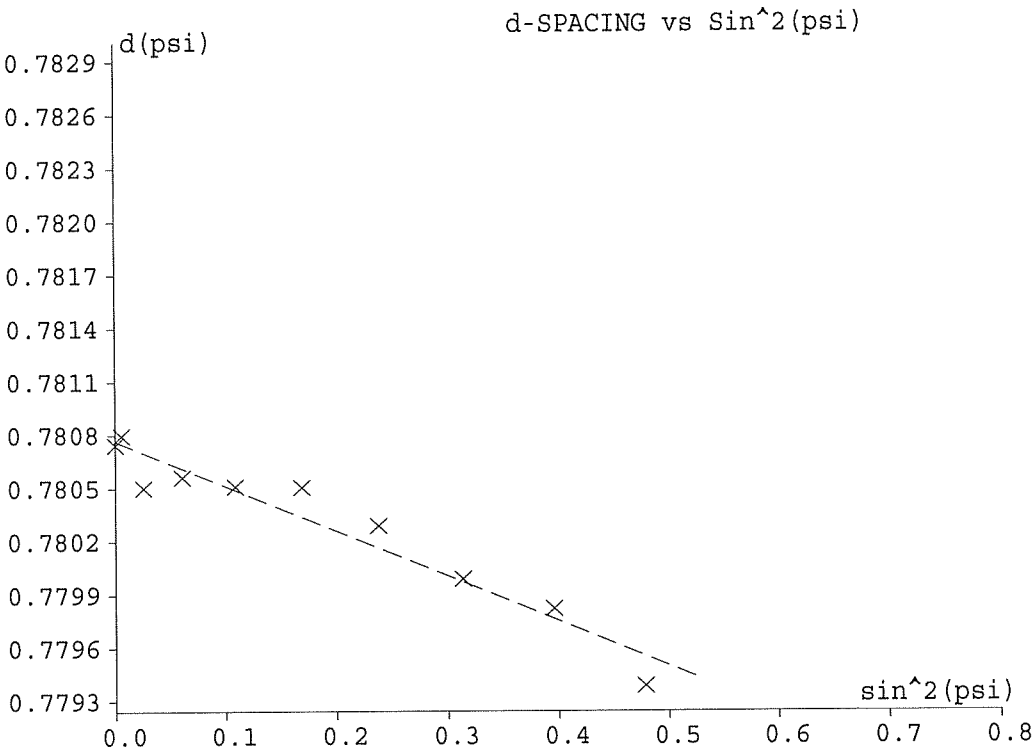
D Spacing Intercept.....: 0.780765  
Slope of Fitted Line.....: -0.002533  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -25.8 KSI -178.2 MPa

Counting Statistics Stress Error (+/-): 1.0 KSI 7.0 MPa  
Probable error.....(+/-): 2.4 KSI 16.8 MPa

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7692.STR  
Sample Description:  
SBIR / WP / CW Holes / AF Std 12 / 0.15" from Hole / Longitudinal  
Circumferential with respect to Hole / ebm

\*Residual Stress.....: -25.8 KSI -178.2 MPa  
Counting Statistics Stress Error (+/-): 1.0 KSI 7.0 MPa  
Probable error.....(+/-): 2.4 KSI 16.8 MPa





===== TEC Stress Analyzer v1.64 =====  
 ===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7687.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 13 / 0.05" from Hole / Longitudinal  
 Circumferential with respect to Hole / ebm

Acquisition date & time: 10/28/2005 2:19pm

Material [hkl].....: Al 5083-H23 [333]  
 Depth.....: 0.0000000  
 Phi angle.....: 0.00  
 Collimator.....: Round\_4mm  
 Bracket.....: 160s  
 Peak Bounding Range [percent].....: 20  
 X-ray Target Description and Wavelength: copper 1.54056  
 PSI Oscillation Angle Range.....: 2.00  
 Spectra count time (PSI=0).....: 20.0  
 High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
 ADC Channels Full Scale.....: 256  
 Detector Calibration Coefficients:  
 A 1.99867E-07 B -7.91049E-05 C 0.0688651 D 148.0028

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00009	152.47	1172.1	4.78	0.26952	161.10	0.780875	0.000062
5.0	0.00619	150.20	1211.0	4.53	0.26706	160.97	0.781024	0.000063
10.0	0.02703	151.97	1291.2	4.64	0.26888	161.07	0.780908	0.000051
15.0	0.06098	157.68	1369.1	4.46	0.27251	161.41	0.780534	0.000042
20.0	0.10870	159.31	1271.2	4.66	0.27475	161.50	0.780430	0.000079
25.0	0.16924	157.86	1092.5	4.64	0.27355	161.42	0.780523	0.000053
30.0	0.23731	162.65	1372.0	4.46	0.27643	161.69	0.780215	0.000044
35.0	0.31406	165.02	1399.0	4.54	0.27898	161.83	0.780065	0.000040
40.0	0.39459	170.79	1036.1	4.16	0.28195	162.17	0.779700	0.000038
45.0	0.47947	173.90	895.1	4.05	0.28428	162.35	0.779506	0.000049

Fitted Delta D vs Sin^2(psi) Data:

D Spacing Intercept.....: 0.780902  
 Slope of Fitted Line.....: -0.002915  
 Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -29.7 KSI -205.0 MPa

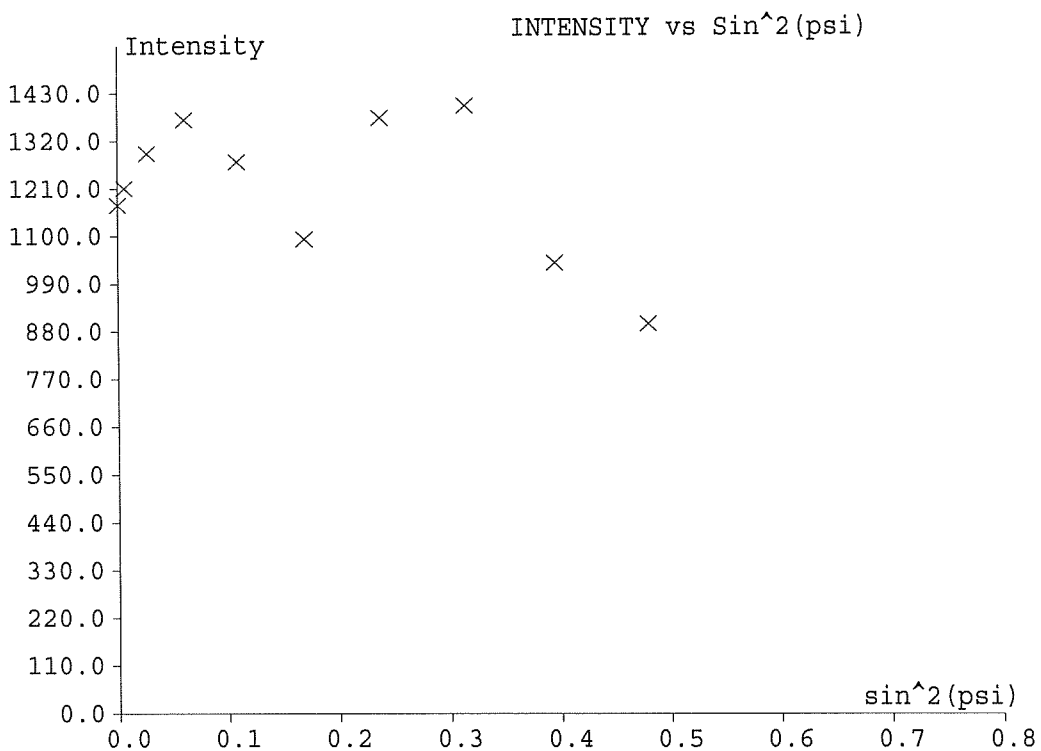
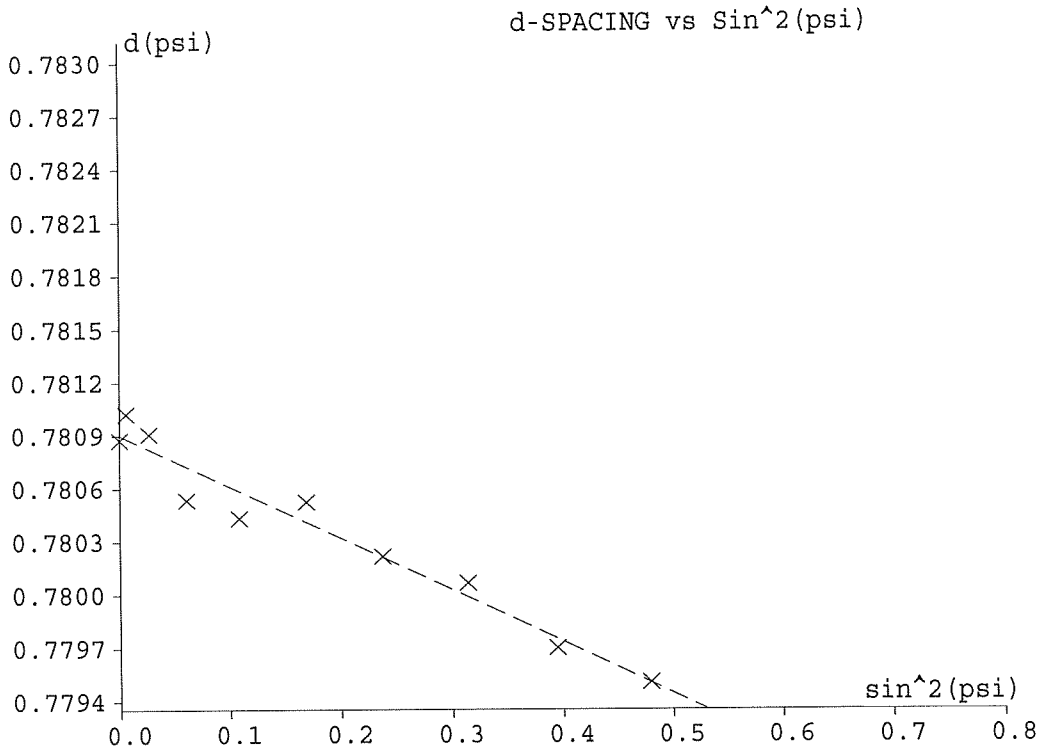
Counting Statistics Stress Error (+/-): 1.0 KSI 7.0 MPa  
 Probable error.....(+/-): 2.3 KSI 16.1 MPa

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7687.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 13 / 0.05" from Hole / Longitudinal  
Circumferential with respect to Hole / ebm

*Residual Stress.....:	-29.7 KSI	-205.0 MPa
Counting Statistics Stress Error (+/-):	1.0 KSI	7.0 MPa
Probable error.....(+/-):	2.3 KSI	16.1 MPa



===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7688.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 13 / 0.10" from Hole / Longitudinal  
Circumferential with respect to Hole / ebm

Acquisition date & time: 10/28/2005 2:24pm

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 20.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A 1.99867E-07 B -7.91049E-05 C 0.0688651 D 148.0028

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp	Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00016	158.15	1079.3	4.77	0.27402		161.43	0.780505	0.000047
5.0	0.00581	155.11	1227.1	4.46	0.27048		161.26	0.780701	0.000054
10.0	0.02602	158.20	1508.0	4.41	0.27261		161.44	0.780501	0.000045
15.0	0.06094	157.83	1385.4	4.33	0.27180		161.42	0.780524	0.000045
20.0	0.10868	159.34	1296.5	4.29	0.27269		161.50	0.780426	0.000036
25.0	0.16881	158.98	1320.0	4.44	0.27336		161.48	0.780450	0.000049
30.0	0.23773	161.62	1648.9	4.05	0.27312		161.64	0.780278	0.000033
35.0	0.31530	162.34	1629.2	4.11	0.27399		161.68	0.780232	0.000033
40.0	0.39647	166.99	1385.3	3.94	0.27730		161.95	0.779937	0.000039
45.0	0.48082	171.28	815.7	4.35	0.28350		162.20	0.779671	0.000057

Fitted Delta D vs Sin^2(psi) Data:

D Spacing Intercept.....: 0.780631  
Slope of Fitted Line.....: -0.001713  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -17.5 KSI -120.5 MPa

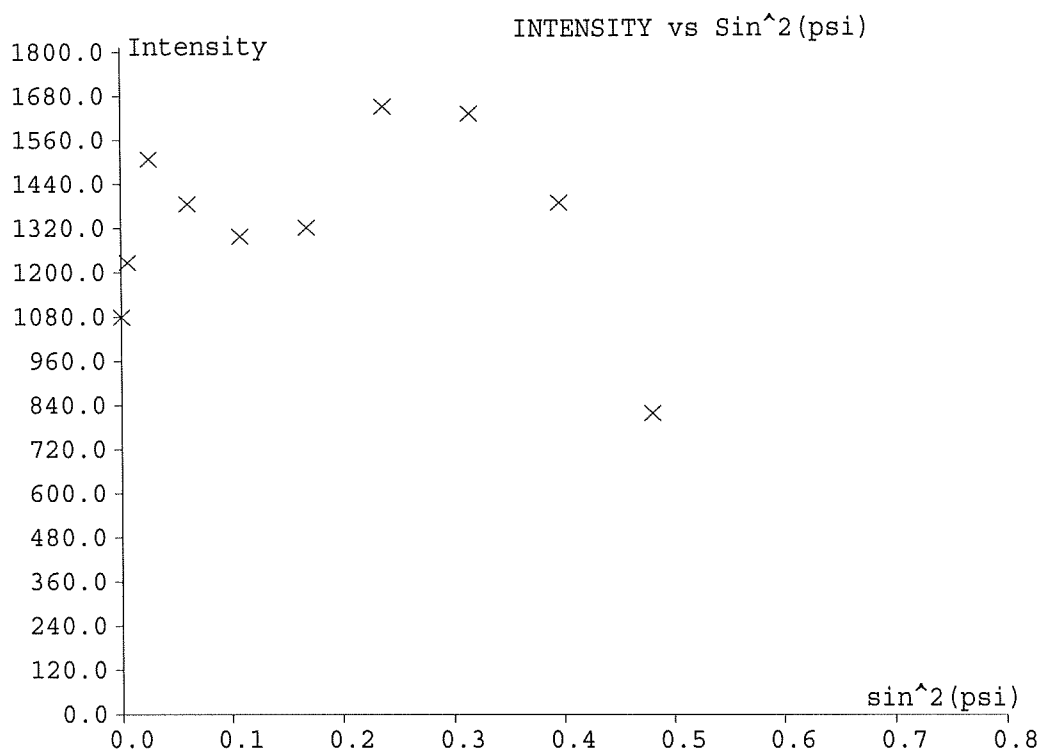
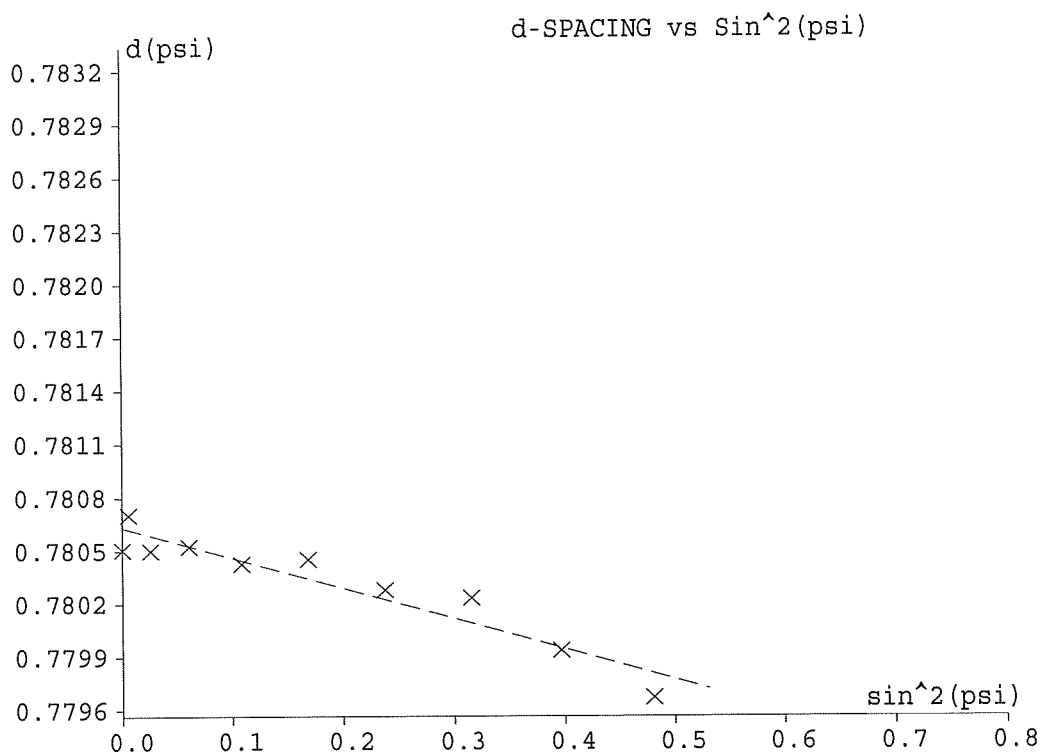
Counting Statistics Stress Error (+/-): 1.0 KSI 6.7 MPa  
Probable error.....(+/-): 2.0 KSI 14.0 MPa

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7688.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 13 / 0.10" from Hole / Longitudinal  
Circumferential with respect to Hole / ebm

*Residual Stress.....:	-17.5 KSI	-120.5 MPa
Counting Statistics Stress Error (+/-):	1.0 KSI	6.7 MPa
Probable error.....(+/-):	2.0 KSI	14.0 MPa



===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7689.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 13 / 0.15" from Hole / Longitudinal  
Circumferential with respect to Hole / ebm

Acquisition date & time: 10/28/2005 2:29pm

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 20.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A 1.99867E-07 B -7.91049E-05 C 0.0688651 D 148.0028

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00021	161.84	1113.6	4.70	0.27684	161.65	0.780267	0.000059
5.0	0.00542	160.29	1088.1	4.38	0.27401	161.56	0.780366	0.000054
10.0	0.02553	161.16	1480.8	4.07	0.27285	161.61	0.780308	0.000048
15.0	0.06074	158.65	1313.4	4.24	0.27183	161.46	0.780470	0.000044
20.0	0.10851	159.86	1242.5	4.02	0.27165	161.54	0.780391	0.000043
25.0	0.16867	159.33	1384.5	4.19	0.27203	161.50	0.780426	0.000035
30.0	0.23736	162.51	1712.0	4.34	0.27548	161.69	0.780223	0.000032
35.0	0.31586	161.13	1758.3	3.85	0.27179	161.61	0.780308	0.000024
40.0	0.39776	164.40	1635.6	3.99	0.27517	161.80	0.780100	0.000047
45.0	0.48473	163.56	947.8	3.94	0.27414	161.75	0.780153	0.000044

Fitted Delta D vs Sin^2(psi) Data:

D Spacing Intercept.....: 0.780386  
Slope of Fitted Line.....: -0.0004718  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -4.8 KSI -33.2 MPa

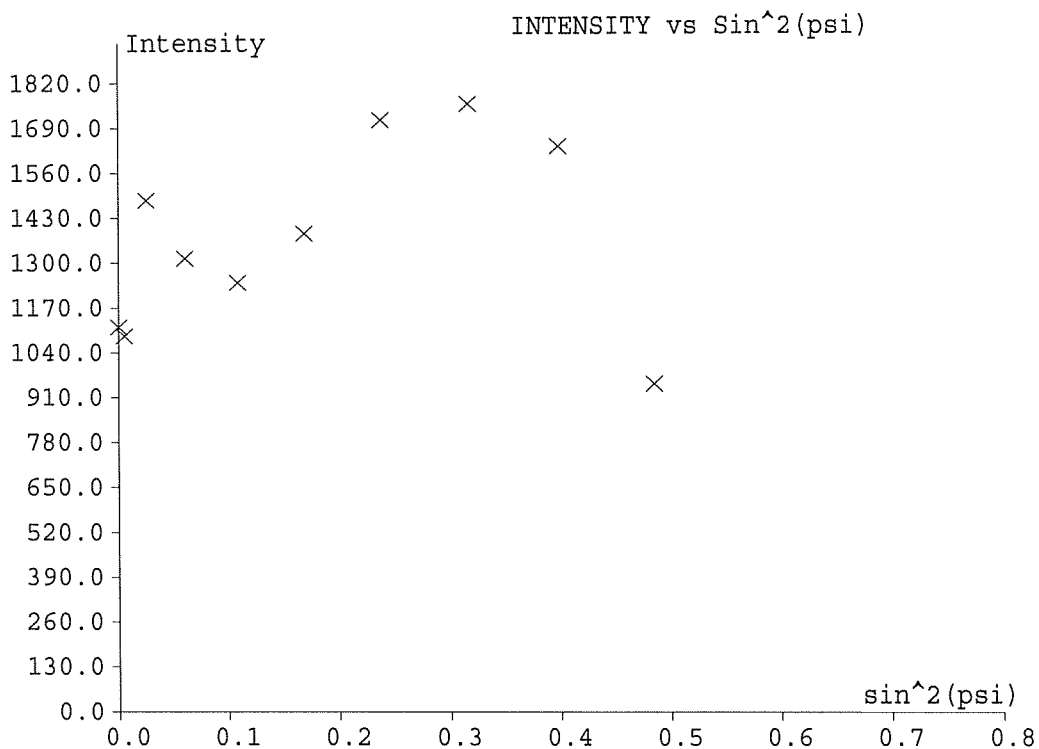
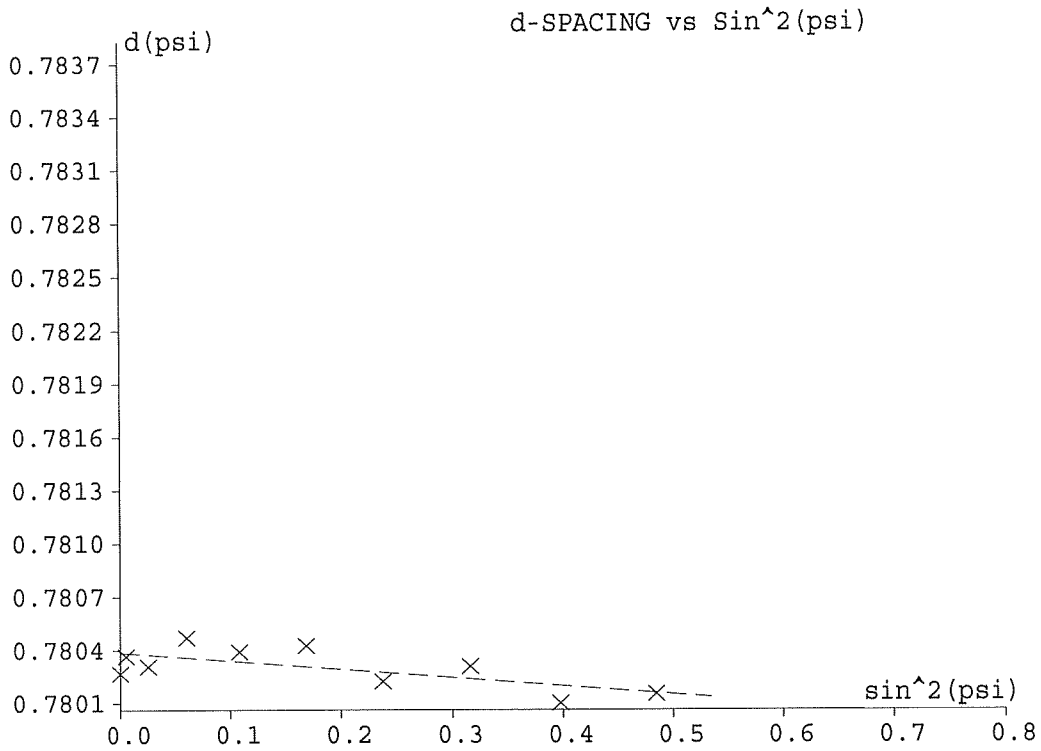
Counting Statistics Stress Error (+/-): 0.9 KSI 6.4 MPa  
Probable error.....(+/-): 1.8 KSI 12.4 MPa  
Warning: Counting statistics may be the controlling error!

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7689.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 13 / 0.15" from Hole / Longitudinal  
Circumferential with respect to Hole / ebm

*Residual Stress.....:	-4.8 KSI	-33.2 MPa
Counting Statistics Stress Error (+/-):	0.9 KSI	6.4 MPa
Probable error.....(+/-):	1.8 KSI	12.4 MPa



===== TEC Stress Analyzer v1.64 =====  
 ===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7684.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 14 / 0.05" from Hole / Longitudinal  
 Circumferential with respect to Hole / ebm

Acquisition date & time: 10/28/2005 2:02pm

Material [hkl].....: Al 5083-H23 [333]  
 Depth.....: 0.0000000  
 Phi angle.....: 0.00  
 Collimator.....: Round\_4mm  
 Bracket.....: 160s  
 Peak Bounding Range [percent].....: 20  
 X-ray Target Description and Wavelength: copper 1.54056  
 PSI Oscillation Angle Range.....: 2.00  
 Spectra count time (PSI=0).....: 20.0  
 High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
 ADC Channels Full Scale.....: 256  
 Detector Calibration Coefficients:  
 A 1.99867E-07 B -7.91049E-05 C 0.0688651 D 148.0028

Psi	Sin <sup>2</sup> (psi)	Pk Chan	Intens	FWHM	Kalp Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00005	147.69	933.5	4.66	0.26554	160.83	0.781191	0.000070
5.0	0.00667	144.28	1009.3	4.90	0.26315	160.63	0.781419	0.000059
10.0	0.02801	146.01	1425.4	4.67	0.26423	160.73	0.781303	0.000056
15.0	0.06230	152.30	1200.8	4.84	0.26948	161.09	0.780886	0.000066
20.0	0.10982	155.77	1016.1	4.74	0.27208	161.29	0.780659	0.000050
25.0	0.17034	154.95	1058.4	4.40	0.26996	161.25	0.780711	0.000048
30.0	0.23712	163.10	1281.9	4.69	0.27783	161.72	0.780187	0.000048
35.0	0.31340	166.38	1488.7	4.25	0.27835	161.91	0.779977	0.000034
40.0	0.39291	174.18	928.4	4.36	0.28621	162.37	0.779491	0.000051
45.0	0.47636	180.03	693.0	4.61	0.29268	162.71	0.779133	0.000052

Fitted Delta D vs Sin<sup>2</sup>(psi) Data:

D Spacing Intercept.....: 0.781310  
 Slope of Fitted Line.....: -0.004532  
 Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -46.2 KSI -318.7 MPa

Counting Statistics Stress Error (+/-): 1.1 KSI 7.7 MPa  
 Probable error.....(+/-): 2.6 KSI 17.8 MPa

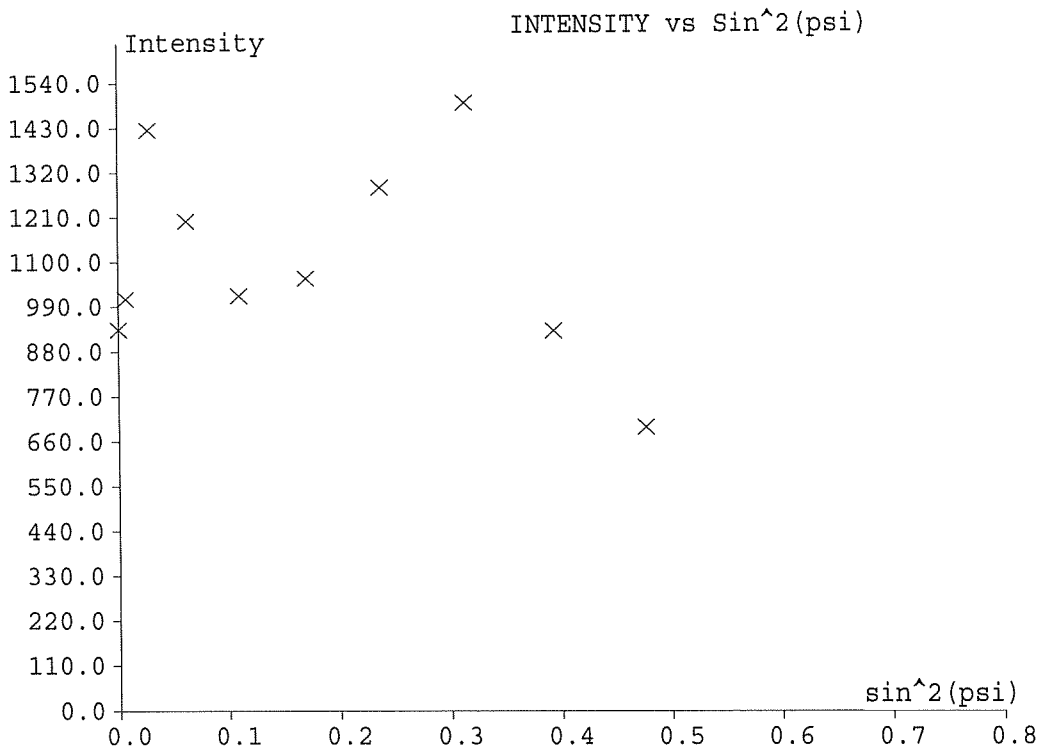
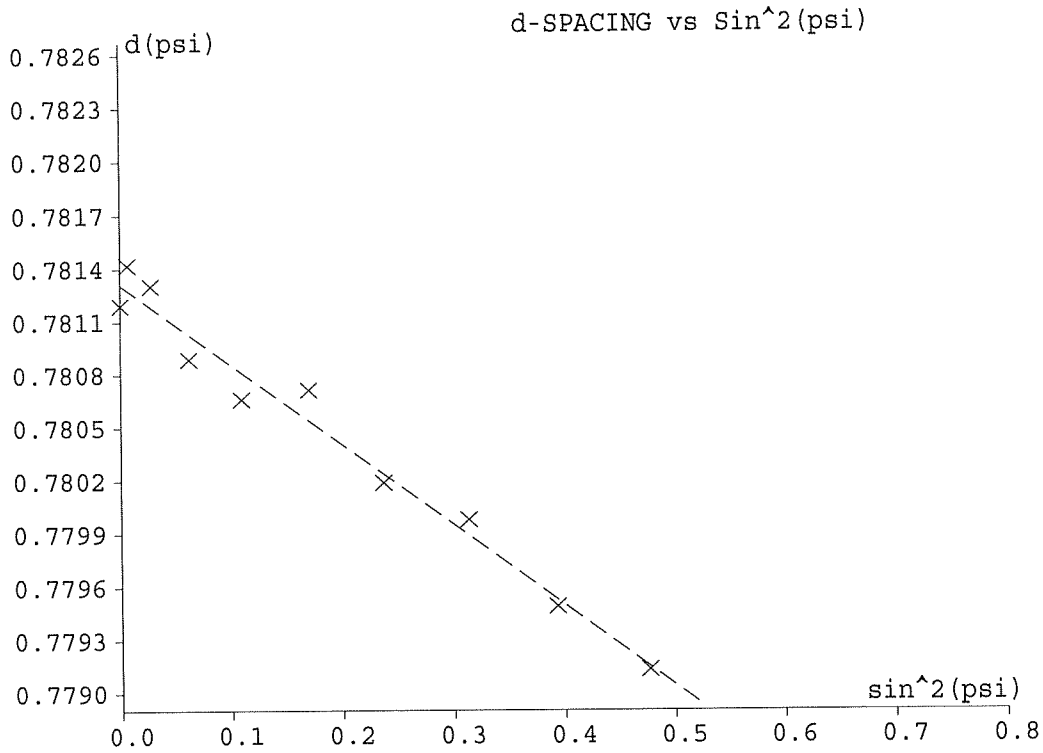
File: C:\STRESS\DATA\2143\2005\SBIR\50632\7684.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 14 / 0.05" from Hole / Longitudinal

Circumferential with respect to Hole / ebm

*Residual Stress.....:	-46.2 KSI	-318.7 MPa
Counting Statistics Stress Error (+/-):	1.1 KSI	7.7 MPa
Probable error.....(+/-):	2.6 KSI	17.8 MPa





===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7685.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 14 / 0.10" from Hole / Longitudinal  
Circumferential with respect to Hole / ebm

Acquisition date & time: 10/28/2005 2:07pm

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 20.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A 1.99867E-07 B -7.91049E-05 C 0.0688651 D 148.0028

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00009	151.85	1256.1	4.53	0.26841	161.07	0.780915	0.000063
5.0	0.00603	152.30	1224.9	5.01	0.26976	161.09	0.780887	0.000079
10.0	0.02756	148.73	1481.4	4.38	0.26501	160.89	0.781120	0.000041
15.0	0.06265	150.86	1285.1	4.54	0.26769	161.01	0.780981	0.000043
20.0	0.11041	153.87	1229.2	4.21	0.26791	161.19	0.780780	0.000057
25.0	0.16979	156.36	1389.1	4.16	0.26956	161.33	0.780617	0.000043
30.0	0.23878	159.22	1476.8	4.29	0.27255	161.50	0.780434	0.000040
35.0	0.31489	163.20	1777.0	4.04	0.27430	161.73	0.780177	0.000037
40.0	0.39522	169.51	1160.9	4.13	0.28060	162.10	0.779779	0.000048
45.0	0.48040	172.11	730.8	4.40	0.28451	162.25	0.779619	0.000048

Fitted Delta D vs Sin^2(psi) Data:

D Spacing Intercept.....: 0.781068  
Slope of Fitted Line.....: -0.002972  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -30.3 KSI -209.1 MPa

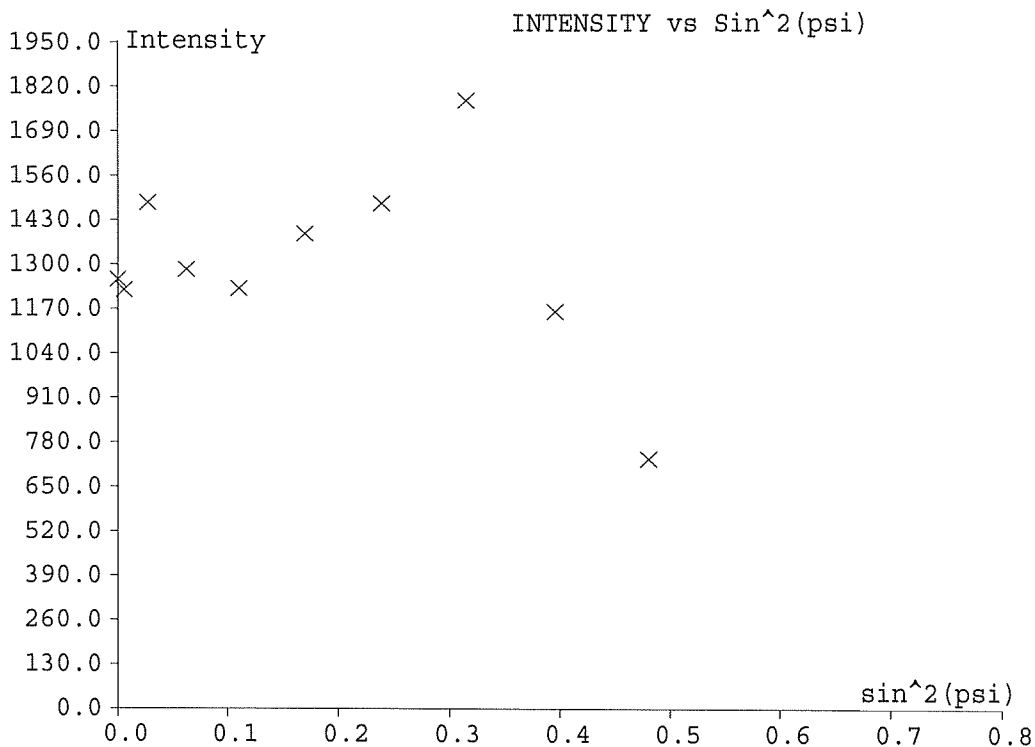
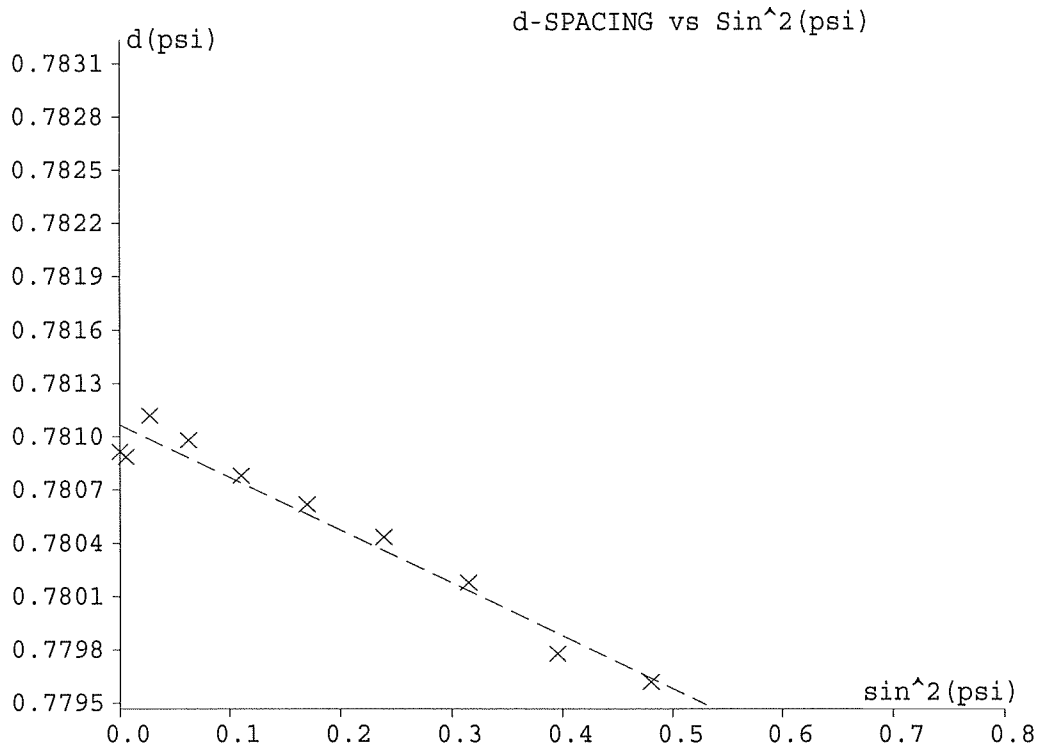
Counting Statistics Stress Error (+/-): 1.1 KSI 7.3 MPa  
Probable error.....(+/-): 2.3 KSI 15.6 MPa

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7685.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 14 / 0.10" from Hole / Longitudinal  
Circumferential with respect to Hole / ebm

*Residual Stress.....:	-30.3 KSI	-209.1 MPa
Counting Statistics Stress Error (+/-):	1.1 KSI	7.3 MPa
Probable error.....(+/-):	2.3 KSI	15.6 MPa



===== TEC Stress Analyzer v1.64 =====  
 ===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7686.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 14 / 0.15" from Hole / Longitudinal  
 Circumferential with respect to Hole / ebm

Acquisition date & time: 10/28/2005 2:12pm

Material [hkl].....: Al 5083-H23 [333]  
 Depth.....: 0.0000000  
 Phi angle.....: 0.00  
 Collimator.....: Round\_4mm  
 Bracket.....: 160s  
 Peak Bounding Range [percent].....: 20  
 X-ray Target Description and Wavelength: copper 1.54056  
 PSI Oscillation Angle Range.....: 2.00  
 Spectra count time (PSI=0).....: 20.0  
 High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
 ADC Channels Full Scale.....: 256  
 Detector Calibration Coefficients:  
 A 1.99867E-07 B -7.91049E-05 C 0.0688651 D 148.0028

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00013	155.71	1434.7	4.59	0.27176	161.29	0.780663	0.000049
5.0	0.00605	151.99	1288.1	4.49	0.26825	161.08	0.780905	0.000045
10.0	0.02709	151.60	1265.8	4.28	0.26662	161.05	0.780930	0.000040
15.0	0.06205	153.29	1456.6	4.31	0.26808	161.15	0.780819	0.000048
20.0	0.10960	156.42	1235.2	4.20	0.26985	161.33	0.780614	0.000045
25.0	0.16964	156.76	1388.3	4.11	0.26967	161.35	0.780592	0.000053
30.0	0.23842	160.03	1609.1	4.02	0.27175	161.54	0.780380	0.000039
35.0	0.31518	162.57	1849.5	3.97	0.27350	161.69	0.780217	0.000030
40.0	0.39700	165.95	1110.0	4.26	0.27803	161.89	0.780004	0.000045
45.0	0.48430	164.42	771.8	4.16	0.27601	161.80	0.780100	0.000048

Fitted Delta D vs Sin^2(psi) Data:

D Spacing Intercept.....: 0.780853  
 Slope of Fitted Line.....: -0.001829  
 Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -18.7 KSI -128.6 MPa

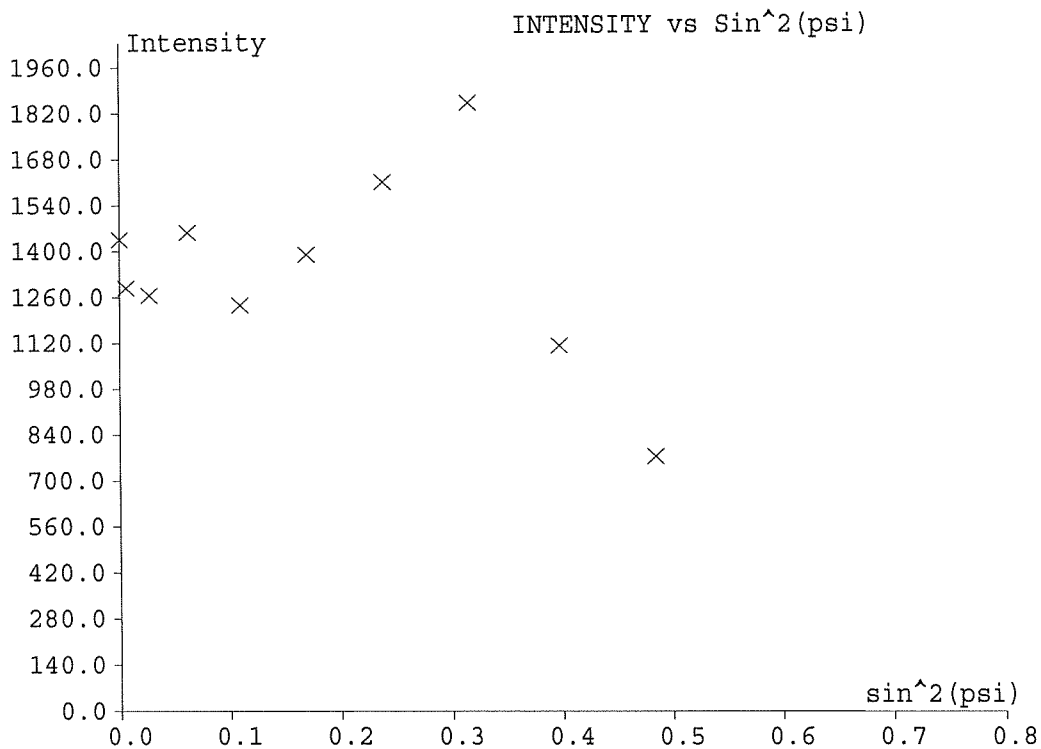
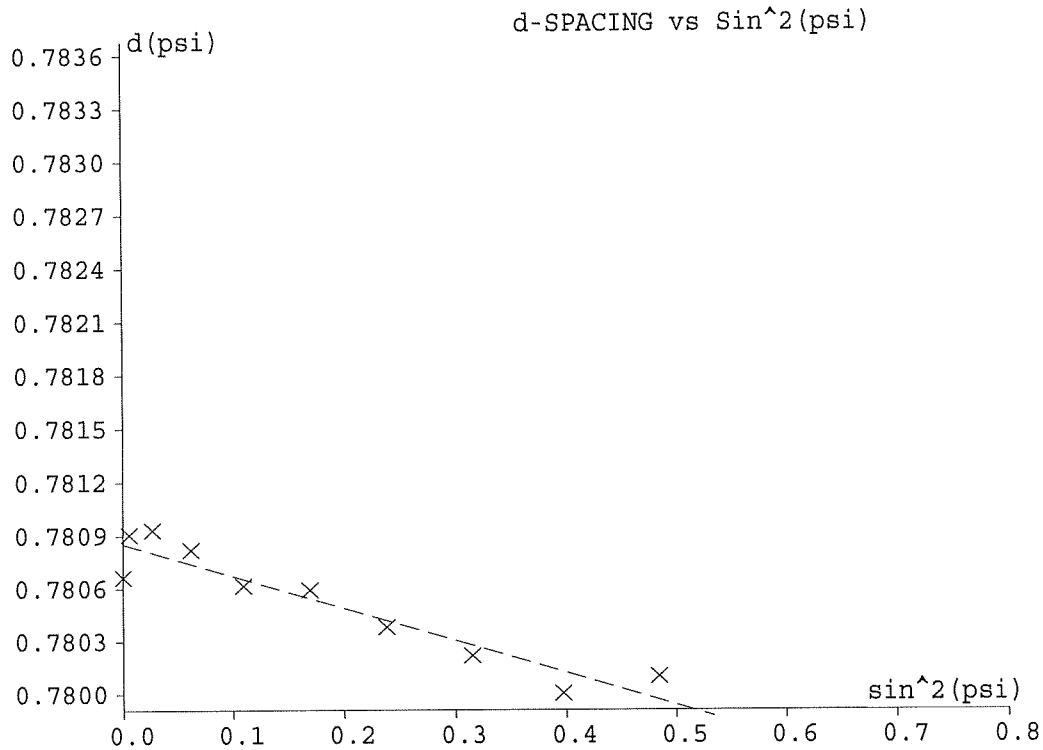
Counting Statistics Stress Error (+/-): 0.9 KSI 6.2 MPa  
 Probable error.....(+/-): 2.3 KSI 15.5 MPa

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7686.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 14 / 0.15" from Hole / Longitudinal  
Circumferential with respect to Hole / ebm

*Residual Stress.....:	-18.7 KSI	-128.6 MPa
Counting Statistics Stress Error (+/-):	0.9 KSI	6.2 MPa
Probable error.....(+/-):	2.3 KSI	15.5 MPa



===== TEC Stress Analyzer v1.64 =====  
 ===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7681.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 15 / 0.05" from Hole / Longitudinal  
 Circumferential with respect to Hole / ebm

Acquisition date & time: 10/28/2005 1:43pm

Material [hkl].....: Al 5083-H23 [333]  
 Depth.....: 0.0000000  
 Phi angle.....: 0.00  
 Collimator.....: Round\_4mm  
 Bracket.....: 160s  
 Peak Bounding Range [percent].....: 20  
 X-ray Target Description and Wavelength: copper 1.54056  
 PSI Oscillation Angle Range.....: 2.00  
 Spectra count time (PSI=0).....: 20.0  
 High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
 ADC Channels Full Scale.....: 256  
 Detector Calibration Coefficients:  
 A 1.99867E-07 B -7.91049E-05 C 0.0688651 D 148.0028

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00007	149.79	1048.7	5.09	0.26786	160.95	0.781052	0.000107
5.0	0.00606	151.95	998.4	4.94	0.26938	161.07	0.780910	0.000060
10.0	0.02690	152.77	1455.9	4.86	0.26989	161.12	0.780856	0.000060
15.0	0.06139	156.03	1275.5	4.57	0.27192	161.31	0.780642	0.000044
20.0	0.10923	157.62	1084.5	4.96	0.27396	161.40	0.780540	0.000070
25.0	0.16761	162.16	1171.0	4.86	0.27740	161.66	0.780247	0.000066
30.0	0.23749	162.22	1436.7	4.33	0.27516	161.67	0.780242	0.000050
35.0	0.31225	168.84	1364.8	4.41	0.28163	162.06	0.779823	0.000039
40.0	0.39314	173.72	1068.3	4.30	0.28545	162.34	0.779519	0.000047
45.0	0.47815	176.51	779.0	4.32	0.28815	162.50	0.779347	0.000050

Fitted Delta D vs Sin^2(psi) Data:

D Spacing Intercept.....: 0.780937  
 Slope of Fitted Line.....: -0.003457  
 Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -35.3 KSI -243.2 MPa

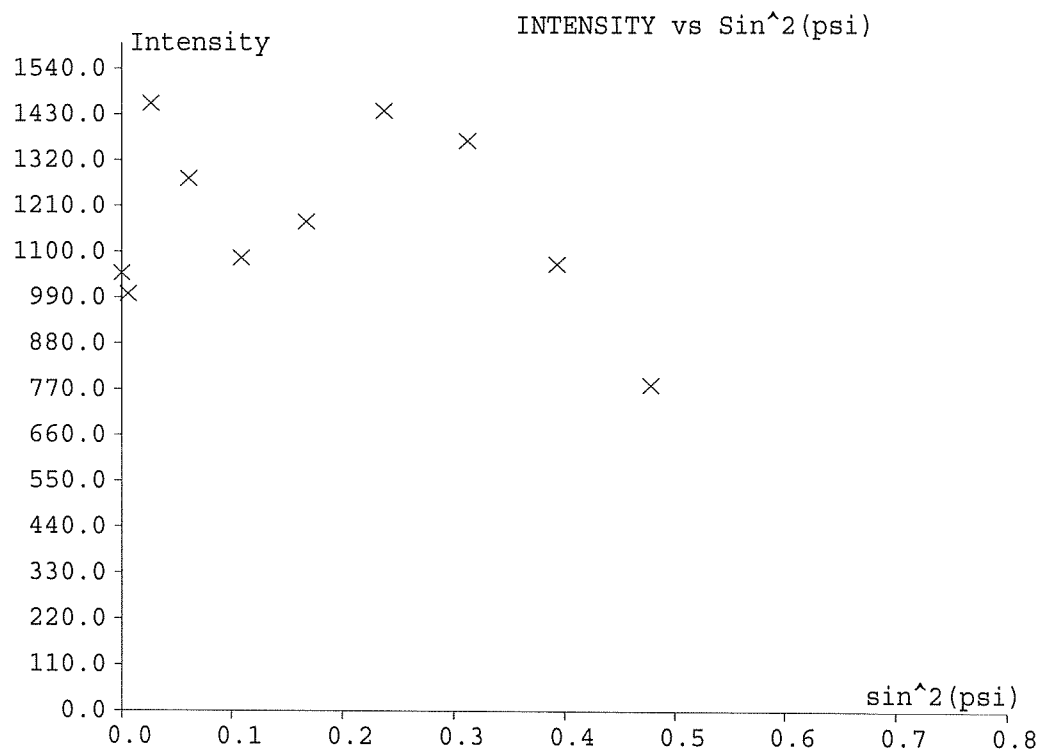
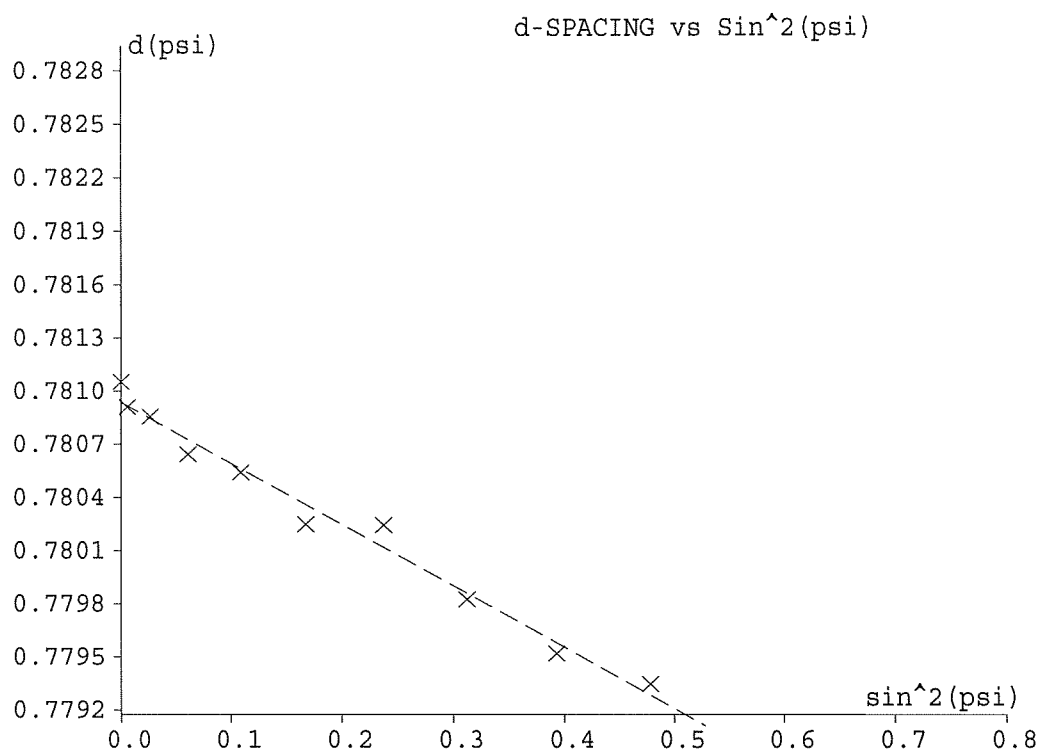
Counting Statistics Stress Error (+/-): 1.2 KSI 8.4 MPa  
 Probable error.....(+/-): 1.7 KSI 11.7 MPa  
 Warning: Counting statistics may be the controlling error!

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7681.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 15 / 0.05" from Hole / Longitudinal  
Circumferential with respect to Hole / ebm

*Residual Stress.....:	-35.3 KSI	-243.2 MPa
Counting Statistics Stress Error (+/-):	1.2 KSI	8.4 MPa
Probable error.....(+/-):	1.7 KSI	11.7 MPa



===== TEC Stress Analyzer v1.64 =====  
 ===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7682.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 15 / 0.10" from Hole / Longitudinal  
 Circumferential with respect to Hole / ebm

Acquisition date & time: 10/28/2005 1:49pm

Material [hkl].....: Al 5083-H23 [333]  
 Depth.....: 0.0000000  
 Phi angle.....: 0.00  
 Collimator.....: Round\_4mm  
 Bracket.....: 160s  
 Peak Bounding Range [percent].....: 20  
 X-ray Target Description and Wavelength: copper 1.54056  
 PSI Oscillation Angle Range.....: 2.00  
 Spectra count time (PSI=0).....: 20.0  
 High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
 ADC Channels Full Scale.....: 256  
 Detector Calibration Coefficients:  
 A 1.99867E-07 B -7.91049E-05 C 0.0688651 D 148.0028

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp Cor	A 2-Theta	D Spacing	St. Dev.
0.0	0.00010	153.67	1138.2	4.79	0.27048	161.17	0.780797	0.000074
5.0	0.00583	154.87	1312.7	4.61	0.27114	161.24	0.780718	0.000062
10.0	0.02686	153.01	1303.6	4.44	0.26871	161.14	0.780838	0.000052
15.0	0.06139	155.98	1406.0	4.33	0.27030	161.31	0.780644	0.000047
20.0	0.10928	157.44	1232.3	4.43	0.27215	161.39	0.780549	0.000040
25.0	0.16838	160.11	1417.1	4.30	0.27333	161.55	0.780376	0.000044
30.0	0.23689	163.58	1773.7	4.26	0.27581	161.75	0.780154	0.000034
35.0	0.31393	165.28	1693.9	4.39	0.27826	161.85	0.780047	0.000045
40.0	0.39439	171.19	1389.4	4.19	0.28249	162.19	0.779675	0.000035
45.0	0.47963	173.62	1091.9	4.30	0.28540	162.34	0.779525	0.000039

Fitted Delta D vs Sin^2(psi) Data:

D Spacing Intercept.....: 0.780820  
 Slope of Fitted Line.....: -0.002716  
 Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -27.7 KSI -191.1 MPa

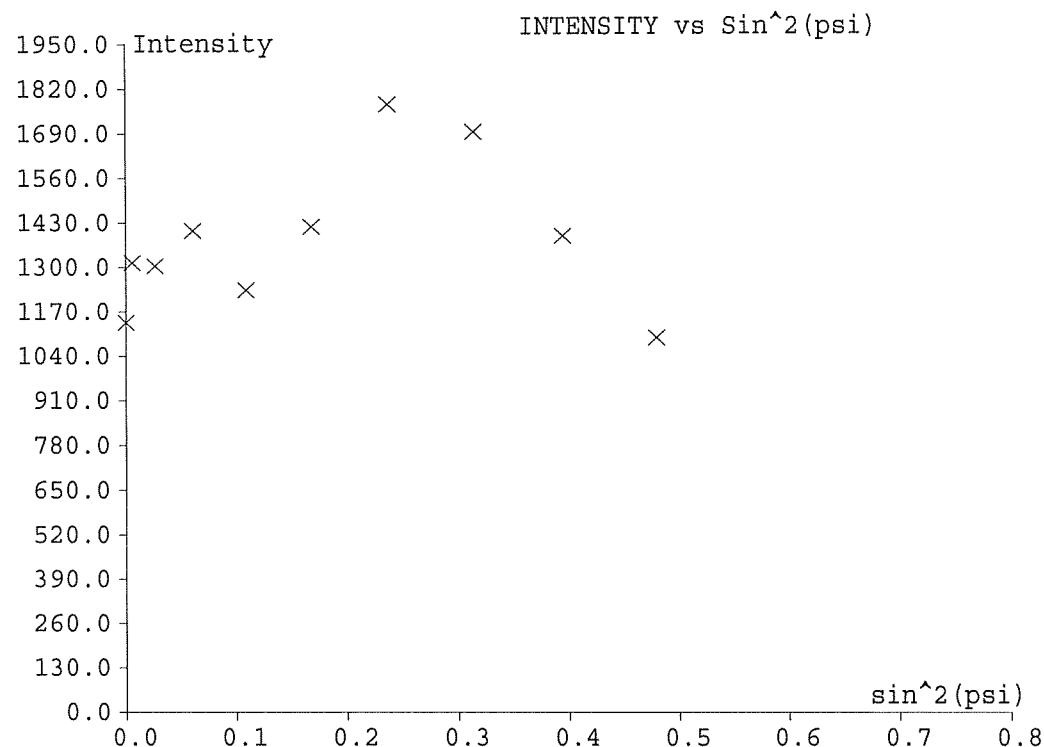
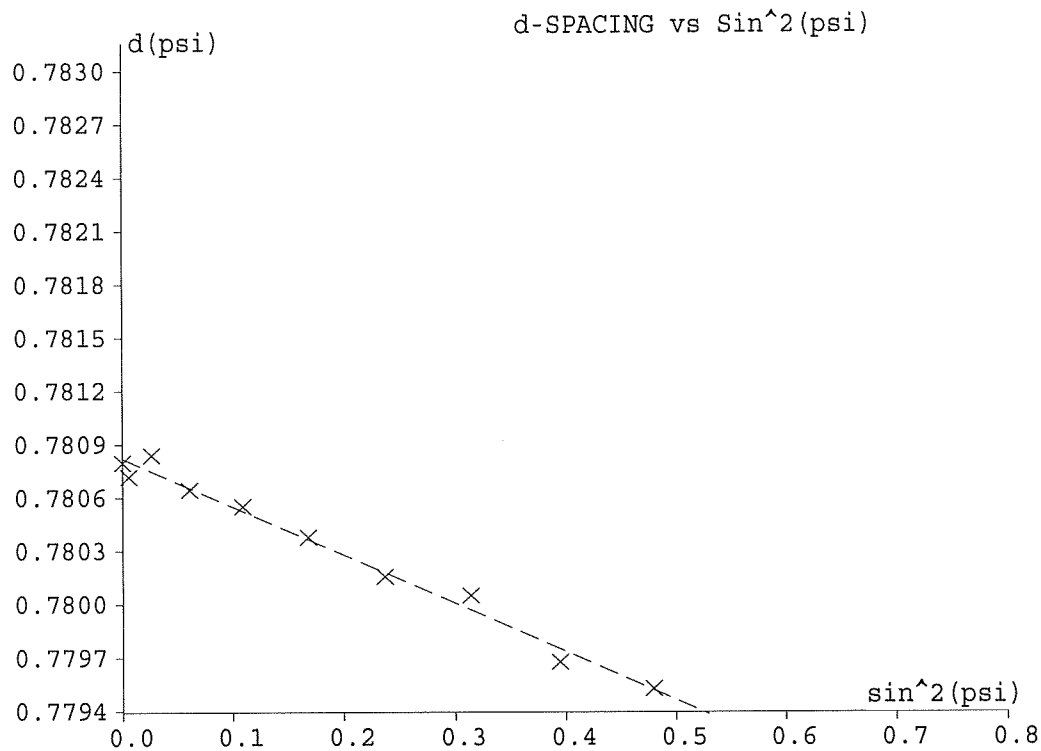
Counting Statistics Stress Error (+/-): 1.0 KSI 6.7 MPa

Probable error.....(+/-): 1.2 KSI 8.4 MPa

Warning: Counting statistics may be the controlling error!

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7682.STR  
Sample Description:  
SBIR / WP / CW Holes / AF Std 15 / 0.10" from Hole / Longitudinal  
Circumferential with respect to Hole / ebm

\*Residual Stress.....: -27.7 KSI -191.1 MPa  
Counting Statistics Stress Error (+/-): 1.0 KSI 6.7 MPa  
Probable error.....(+/-): 1.2 KSI 8.4 MPa





===== TEC Stress Analyzer v1.64 =====  
 ===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7683.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 15 / 0.15" from Hole / Longitudinal  
 Circumferential with respect to Hole / ebm

Acquisition date & time: 10/28/2005 1:55pm

Material [hkl].....: Al 5083-H23 [333]  
 Depth.....: 0.0000000  
 Phi angle.....: 0.00  
 Collimator.....: Round\_4mm  
 Bracket.....: 160s  
 Peak Bounding Range [percent].....: 20  
 X-ray Target Description and Wavelength: copper 1.54056  
 PSI Oscillation Angle Range.....: 2.00  
 Spectra count time (PSI=0).....: 20.0  
 High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
 ADC Channels Full Scale.....: 256  
 Detector Calibration Coefficients:  
 A 1.99867E-07 B -7.91049E-05 C 0.0688651 D 148.0028

Psi	Sin <sup>2</sup> (psi)	Pk Chan	Intens	FWHM	Kalp Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00014	157.02	1202.0	4.31	0.27097	161.37	0.780576	0.000047
5.0	0.00572	156.21	1121.8	4.37	0.27075	161.32	0.780629	0.000050
10.0	0.02656	154.83	1354.6	4.28	0.26908	161.24	0.780718	0.000037
15.0	0.06124	156.57	1361.3	3.89	0.26851	161.34	0.780603	0.000044
20.0	0.10901	158.28	1294.7	4.23	0.27146	161.44	0.780493	0.000038
25.0	0.16859	159.52	1630.8	4.07	0.27161	161.51	0.780413	0.000038
30.0	0.23793	161.15	1792.8	3.95	0.27229	161.61	0.780308	0.000026
35.0	0.31496	163.05	1651.5	3.99	0.27396	161.72	0.780186	0.000032
40.0	0.39702	165.91	1437.2	4.21	0.27765	161.89	0.780006	0.000032
45.0	0.48279	167.36	1242.8	3.89	0.27740	161.97	0.779913	0.000030

Fitted Delta D vs Sin<sup>2</sup>(psi) Data:

D Spacing Intercept.....: 0.780668  
 Slope of Fitted Line.....: -0.001574  
 Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -16.1 KSI -110.7 MPa

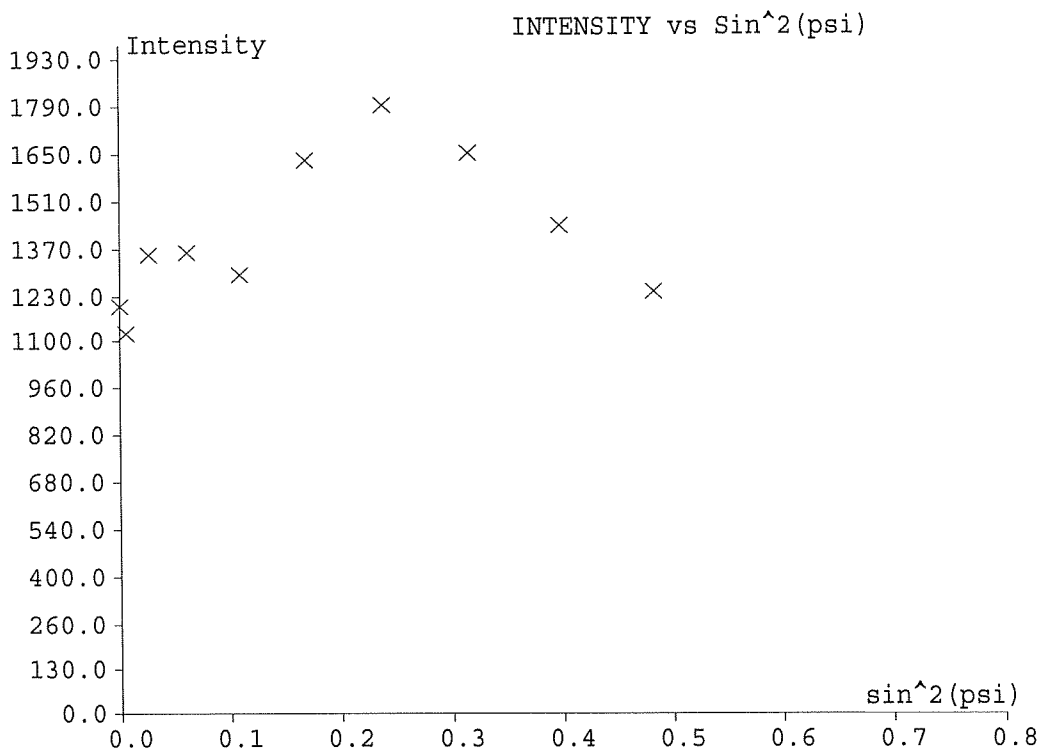
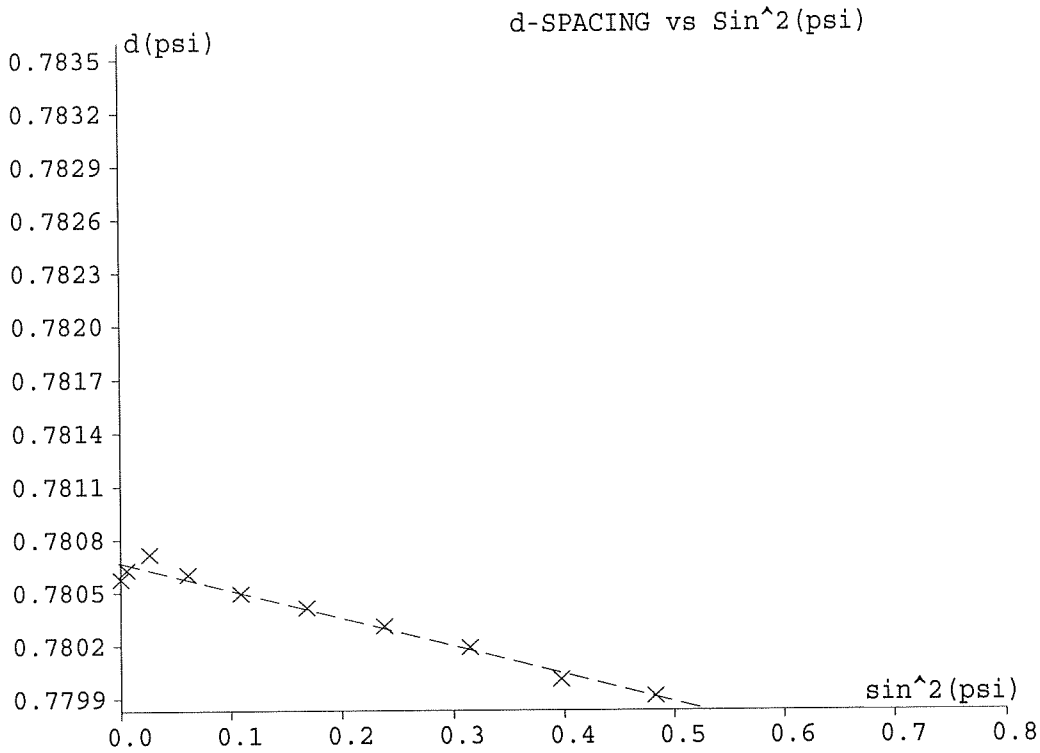
Counting Statistics Stress Error (+/-): 0.7 KSI 5.1 MPa  
 Probable error.....(+/-): 1.0 KSI 6.9 MPa  
 Warning: Counting statistics may be the controlling error!

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7683.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 15 / 0.15" from Hole / Longitudinal  
Circumferential with respect to Hole / ebm

*Residual Stress.....:	-16.1 KSI	-110.7 MPa
Counting Statistics Stress Error (+/-):	0.7 KSI	5.1 MPa
Probable error.....(+/-):	1.0 KSI	6.9 MPa



===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7678.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 16 / 0.05" from Hole / Longitudinal  
Circumferential with respect to Hole / ebm

Acquisition date & time: 10/28/2005 1:25pm

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 20.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A 1.99867E-07 B -7.91049E-05 C 0.0688651 D 148.0028

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp Cor	A	2-Theta	D Spacing	St. Dev.
0.0	0.00008	150.98	963.6	4.67	0.26815		161.02	0.780973	0.000073
5.0	0.00636	148.12	1097.3	4.80	0.26610		160.85	0.781163	0.000065
10.0	0.02734	150.08	1547.1	4.53	0.26701		160.96	0.781032	0.000048
15.0	0.06200	153.50	1164.2	4.59	0.27002		161.16	0.780807	0.000070
20.0	0.10857	159.71	973.8	4.76	0.27524		161.52	0.780405	0.000057
25.0	0.16881	158.99	1071.6	4.64	0.27446		161.48	0.780450	0.000064
30.0	0.23736	162.52	1432.1	4.46	0.27631		161.69	0.780223	0.000041
35.0	0.31261	168.05	1311.1	4.32	0.28033		162.01	0.779872	0.000046
40.0	0.39335	173.29	966.5	4.44	0.28581		162.32	0.779546	0.000045
45.0	0.47755	177.71	808.6	4.52	0.29015		162.57	0.779274	0.000070

Fitted Delta D vs Sin^2(psi) Data:

D Spacing Intercept.....: 0.781050  
Slope of Fitted Line.....: -0.003765  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -38.4 KSI -264.8 MPa

Counting Statistics Stress Error (+/-): 1.2 KSI 8.6 MPa

Probable error.....(+/-): 2.2 KSI 15.0 MPa

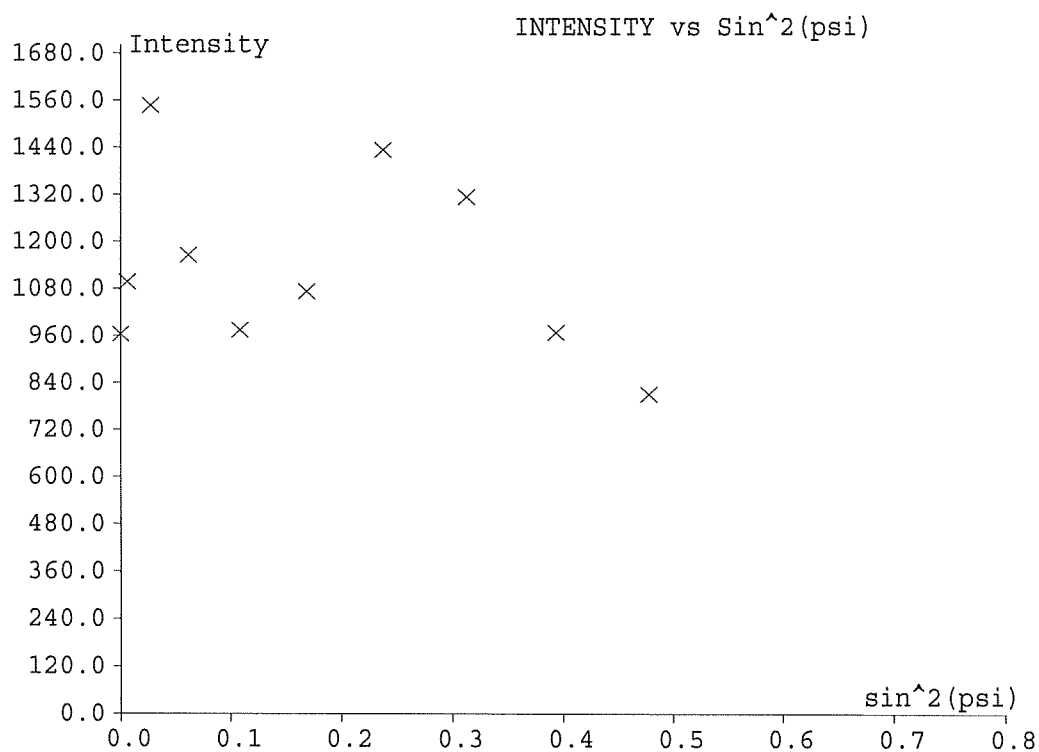
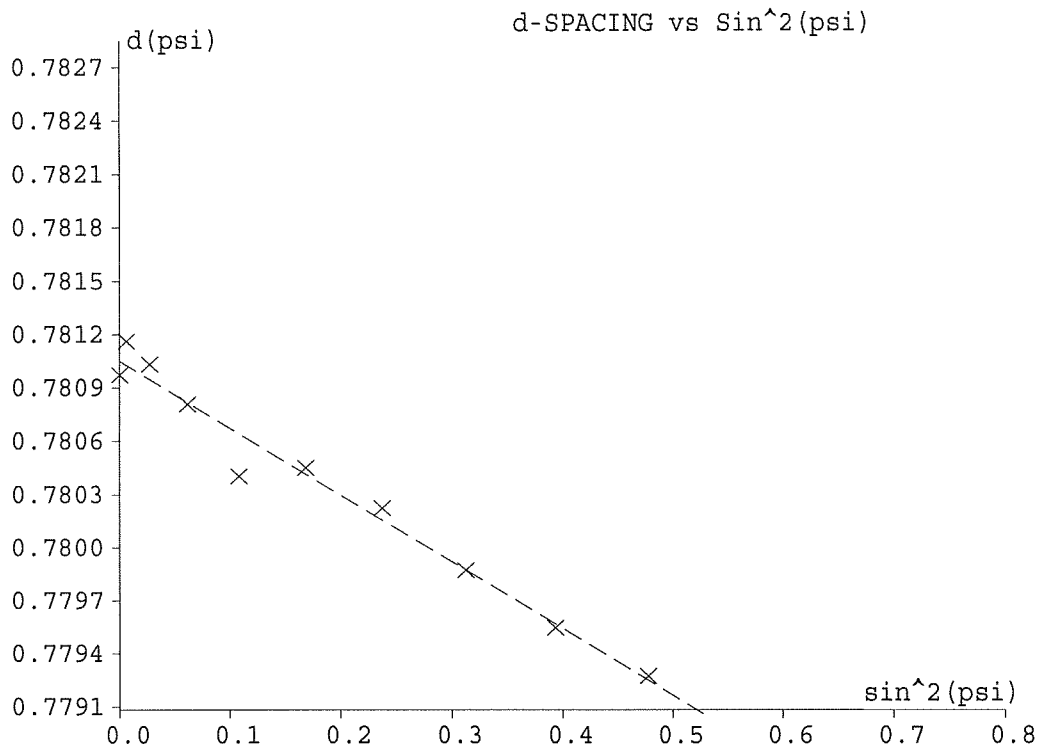
Warning: Counting statistics may be the controlling error!

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7678.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 16 / 0.05" from Hole / Longitudinal  
Circumferential with respect to Hole / ebm

*Residual Stress.....:	-38.4 KSI	-264.8 MPa
Counting Statistics Stress Error (+/-):	1.2 KSI	8.6 MPa
Probable error.....(+/-):	2.2 KSI	15.0 MPa



===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7679.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 16 / 0.10" from Hole / Longitudinal  
Circumferential with respect to Hole / ebm

Acquisition date & time: 10/28/2005 1:31pm

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 20.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A 1.99867E-07 B -7.91049E-05 C 0.0688651 D 148.0028

Psi	Sin <sup>2</sup> (psi)	Pk Chan	Intens	FWHM	Kalp Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00008	150.64	1475.6	4.45	0.26693	161.00	0.780994	0.000089
5.0	0.00602	152.42	1233.9	4.72	0.26939	161.10	0.780878	0.000050
10.0	0.02709	151.58	1482.7	4.35	0.26703	161.05	0.780931	0.000054
15.0	0.06179	154.40	1385.1	4.65	0.27084	161.21	0.780749	0.000049
20.0	0.10949	156.81	1103.4	4.64	0.27272	161.35	0.780592	0.000063
25.0	0.16916	158.06	1420.1	4.28	0.27161	161.43	0.780508	0.000035
30.0	0.23755	162.05	1618.6	4.28	0.27471	161.66	0.780251	0.000035
35.0	0.31335	166.46	1818.7	4.01	0.27715	161.92	0.779970	0.000040
40.0	0.39449	171.00	1065.0	4.29	0.28291	162.18	0.779687	0.000045
45.0	0.48053	171.86	884.2	4.33	0.28389	162.23	0.779634	0.000049

Fitted Delta D vs Sin<sup>2</sup>(psi) Data:

D Spacing Intercept.....: 0.780952  
Slope of Fitted Line.....: -0.002957  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -30.2 KSI -208.0 MPa

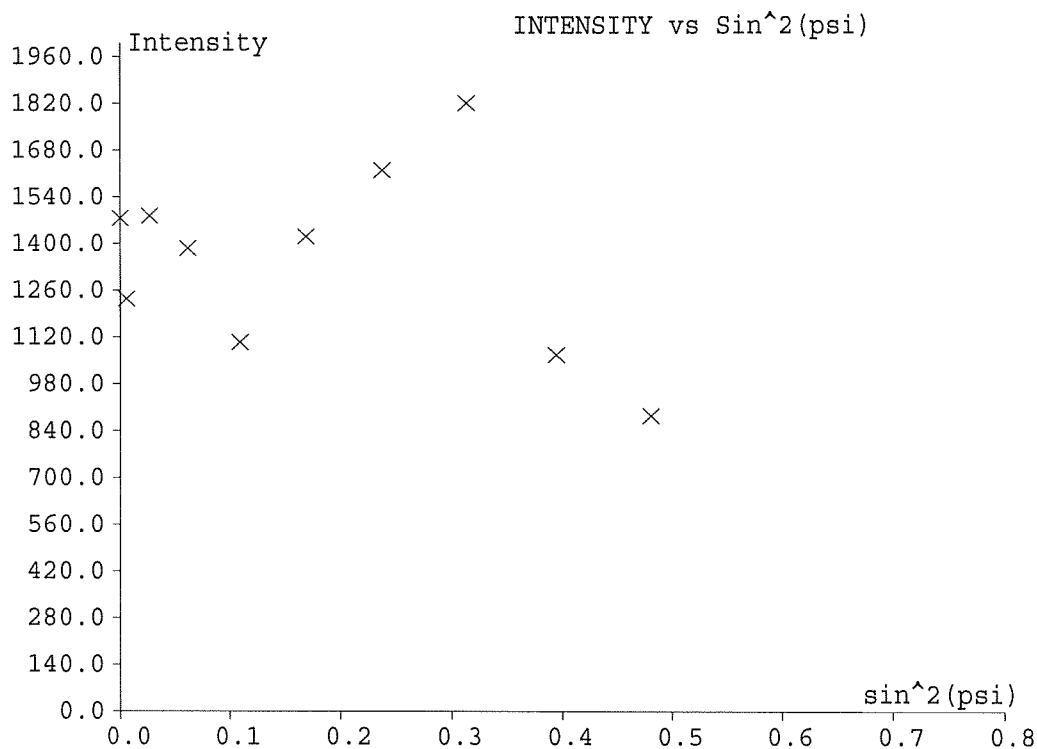
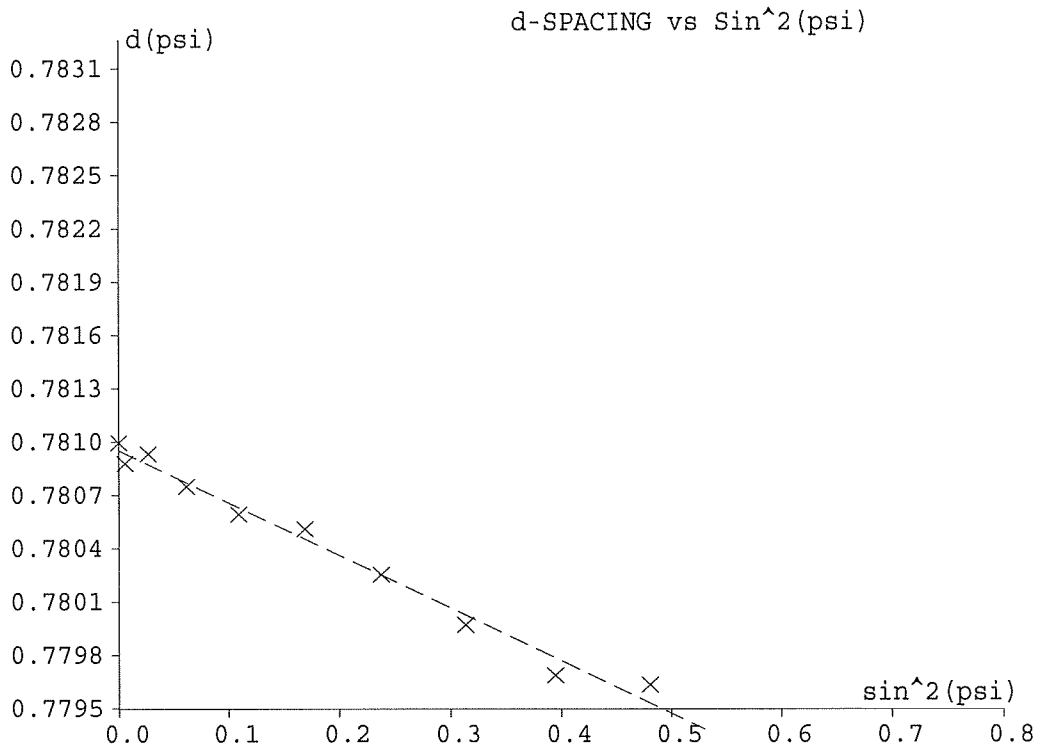
Counting Statistics Stress Error (+/-): 1.1 KSI 7.6 MPa  
Probable error.....(+/-): 1.4 KSI 9.3 MPa  
Warning: Counting statistics may be the controlling error!

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7679.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 16 / 0.10" from Hole / Longitudinal  
Circumferential with respect to Hole / ebm

*Residual Stress.....:	-30.2 KSI	-208.0 MPa
Counting Statistics Stress Error (+/-):	1.1 KSI	7.6 MPa
Probable error.....(+/-):	1.4 KSI	9.3 MPa



===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7680.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 16 / 0.15" from Hole / Longitudinal  
Circumferential with respect to Hole / ebm

Acquisition date & time: 10/28/2005 1:37pm

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 20.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A 1.99867E-07 B -7.91049E-05 C 0.0688651 D 148.0028

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00011	153.99	1474.6	4.35	0.26890	161.19	0.780773	0.000048
5.0	0.00589	154.07	1212.6	4.40	0.26931	161.20	0.780768	0.000076
10.0	0.02640	155.81	1437.6	4.49	0.27124	161.30	0.780656	0.000050
15.0	0.06125	156.57	1346.0	4.36	0.27099	161.34	0.780606	0.000042
20.0	0.10875	159.11	1180.6	4.42	0.27338	161.49	0.780441	0.000054
25.0	0.16922	157.85	1377.2	3.83	0.26920	161.42	0.780520	0.000034
30.0	0.23763	161.86	1690.0	4.09	0.27348	161.65	0.780263	0.000032
35.0	0.31416	164.74	1873.5	3.85	0.27480	161.82	0.780078	0.000038
40.0	0.39632	167.33	1131.3	4.38	0.28004	161.97	0.779918	0.000055
45.0	0.48259	167.79	921.4	4.19	0.27930	162.00	0.779888	0.000038

Fitted Delta D vs Sin^2(psi) Data:

D Spacing Intercept.....: 0.780737  
Slope of Fitted Line.....: -0.001921  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -19.6 KSI -135.2 MPa

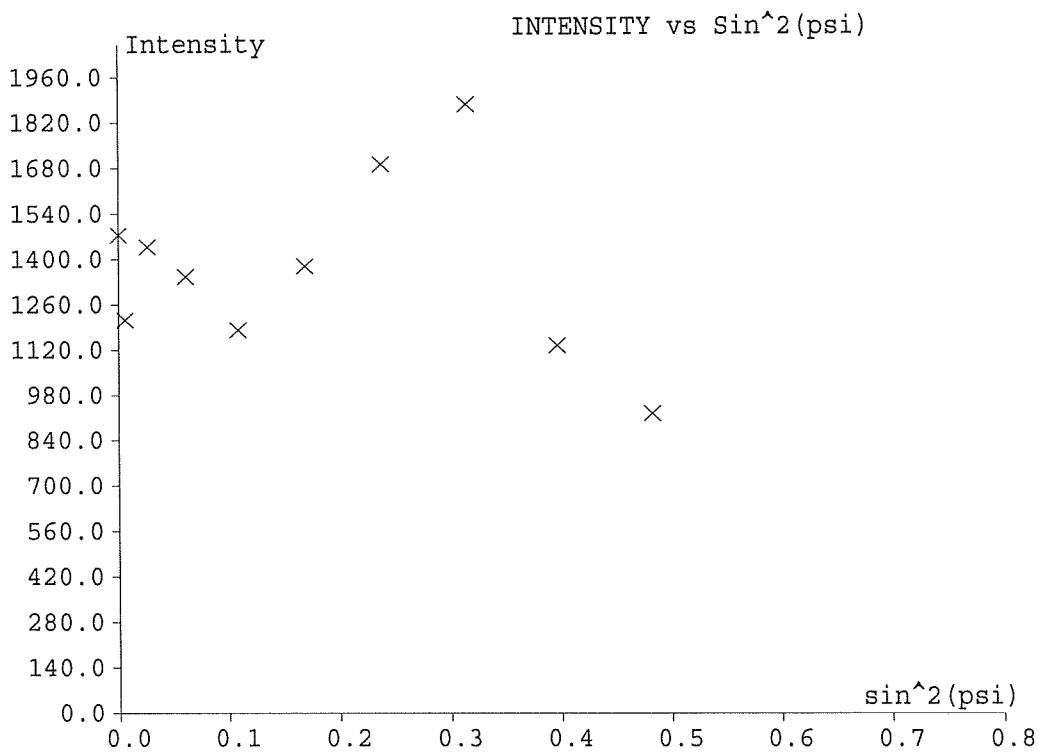
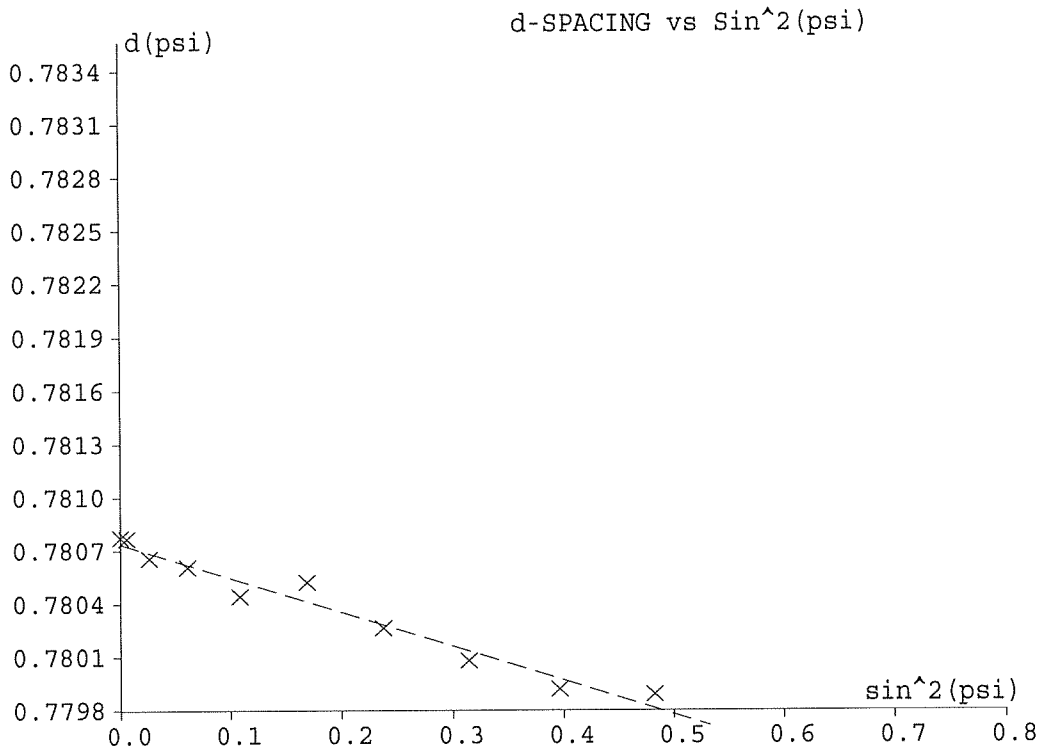
Counting Statistics Stress Error (+/-): 1.0 KSI 6.8 MPa  
Probable error.....(+/-): 1.3 KSI 9.2 MPa  
Warning: Counting statistics may be the controlling error!

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7680.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 16 / 0.15" from Hole / Longitudinal  
Circumferential with respect to Hole / ebm

*Residual Stress.....:	-19.6 KSI	-135.2 MPa
Counting Statistics Stress Error (+/-):	1.0 KSI	6.8 MPa
Probable error.....(+/-):	1.3 KSI	9.2 MPa





===== TEC Stress Analyzer v1.64 =====  
 ===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7675.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 17 / 0.05" from Hole / Longitudinal  
 Circumferential with respect to Hole / ebm

Acquisition date & time: 10/28/2005 1:05pm

Material [hkl].....: Al 5083-H23 [333]  
 Depth.....: 0.0000000  
 Phi angle.....: 0.00  
 Collimator.....: Round\_4mm  
 Bracket.....: 160s  
 Peak Bounding Range [percent].....: 20  
 X-ray Target Description and Wavelength: copper 1.54056  
 PSI Oscillation Angle Range.....: 2.00  
 Spectra count time (PSI=0).....: 20.0  
 High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
 ADC Channels Full Scale.....: 256  
 Detector Calibration Coefficients:  
 A 1.99867E-07 B -7.91049E-05 C 0.0688651 D 148.0028

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp Cor	A	2-Theta	D Spacing	St. Dev.
0.0	0.00008	151.08	1195.8	4.85	0.26852		161.02	0.780967	0.000071
5.0	0.00595	153.33	1169.3	4.83	0.27028		161.15	0.780819	0.000052
10.0	0.02681	153.31	1479.5	4.85	0.27031		161.15	0.780820	0.000062
15.0	0.06076	158.62	1122.8	4.73	0.27433		161.46	0.780475	0.000053
20.0	0.10872	159.25	1203.3	4.56	0.27437		161.50	0.780434	0.000067
25.0	0.16836	160.19	1116.3	4.63	0.27539		161.55	0.780374	0.000072
30.0	0.23617	165.28	1159.2	4.61	0.27959		161.85	0.780048	0.000050
35.0	0.31298	167.31	1241.9	4.58	0.28126		161.97	0.779920	0.000057
40.0	0.39156	176.86	1182.4	4.31	0.28841		162.53	0.779325	0.000052
45.0	0.47726	178.27	840.0	4.57	0.29091		162.61	0.779240	0.000046

Fitted Delta D vs Sin^2(psi) Data:

D Spacing Intercept.....: 0.780868  
 Slope of Fitted Line.....: -0.003499  
 Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -35.7 KSI -246.2 MPa

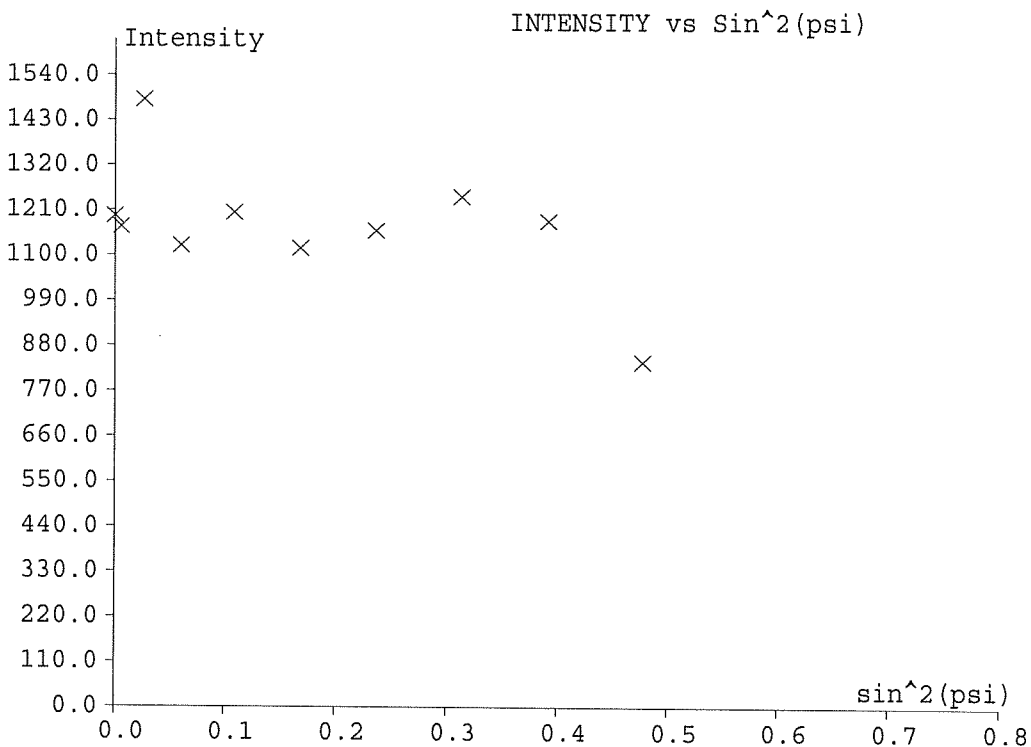
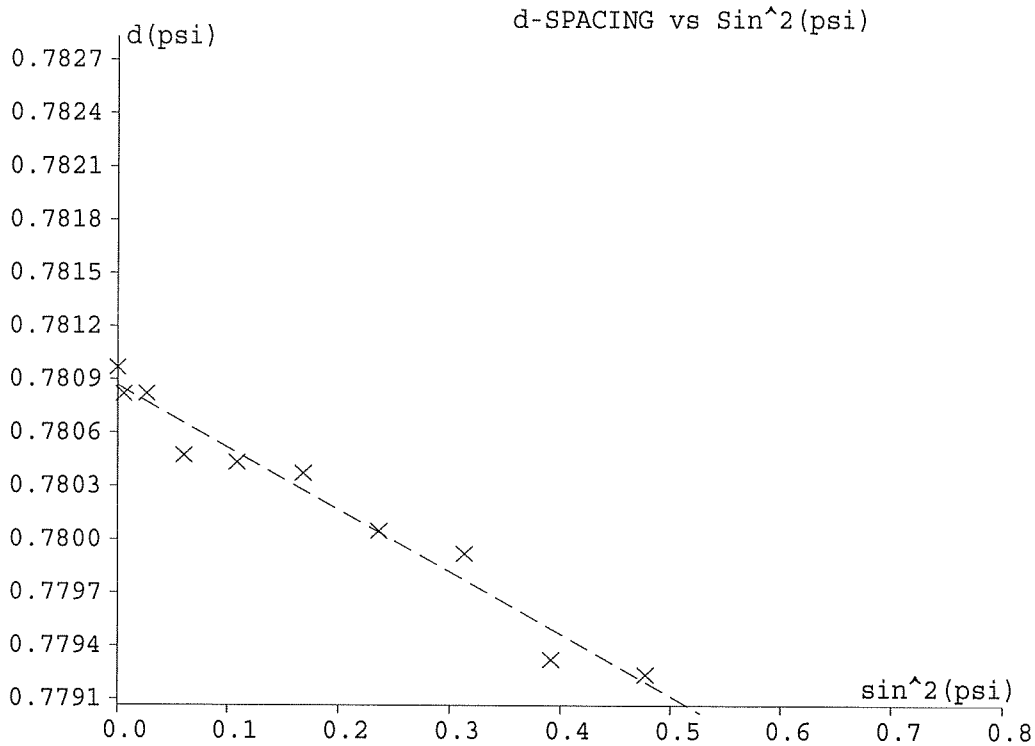
Counting Statistics Stress Error (+/-): 1.1 KSI 7.5 MPa  
 Probable error.....(+/-): 2.4 KSI 16.3 MPa

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7675.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 17 / 0.05" from Hole / Longitudinal  
Circumferential with respect to Hole / ebm

*Residual Stress.....:	-35.7 KSI	-246.2 MPa
Counting Statistics Stress Error (+/-):	1.1 KSI	7.5 MPa
Probable error.....(+/-):	2.4 KSI	16.3 MPa



===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7676.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 17 / 0.10" from Hole / Longitudinal  
Circumferential with respect to Hole / ebm

Acquisition date & time: 10/28/2005 1:12pm

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 20.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A 1.99867E-07 B -7.91049E-05 C 0.0688651 D 148.0028

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00011	154.10	1146.3	4.64	0.27058	161.20	0.780768	0.000079
5.0	0.00559	157.99	1277.0	4.62	0.27362	161.42	0.780515	0.000054
10.0	0.02622	156.97	1495.5	4.61	0.27281	161.36	0.780581	0.000040
15.0	0.06077	158.57	1306.4	4.87	0.27454	161.46	0.780478	0.000060
20.0	0.10781	162.12	1365.2	4.71	0.27707	161.66	0.780250	0.000055
25.0	0.16808	160.87	1347.1	4.13	0.27292	161.59	0.780327	0.000045
30.0	0.23683	163.73	1552.5	4.32	0.27641	161.76	0.780145	0.000037
35.0	0.31393	165.26	1609.7	4.32	0.27777	161.85	0.780048	0.000043
40.0	0.39491	170.14	1563.9	4.15	0.28129	162.13	0.779740	0.000050
45.0	0.47972	173.46	988.1	4.65	0.28698	162.32	0.779536	0.000057

Fitted Delta D vs Sin^2(psi) Data:

D Spacing Intercept.....: 0.780631  
Slope of Fitted Line.....: -0.002185  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -22.3 KSI -153.8 MPa

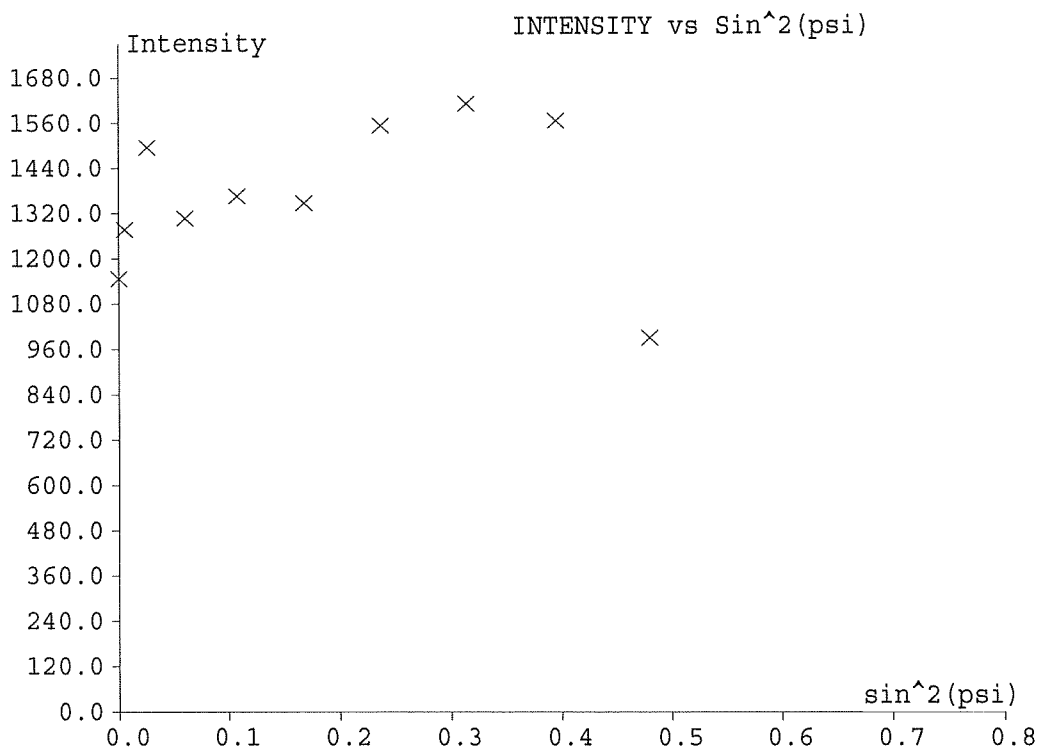
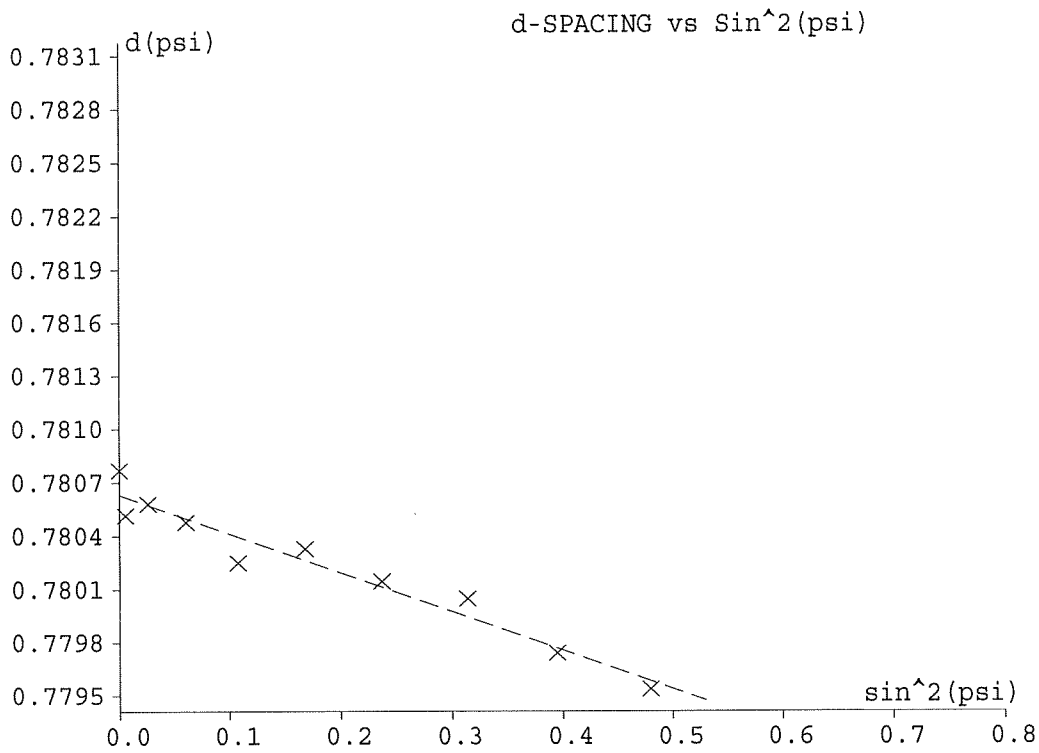
Counting Statistics Stress Error (+/-): 1.1 KSI 7.8 MPa  
Probable error.....(+/-): 1.9 KSI 12.8 MPa  
Warning: Counting statistics may be the controlling error!

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7676.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 17 / 0.10" from Hole / Longitudinal  
Circumferential with respect to Hole / ebm

*Residual Stress.....:	-22.3 KSI	-153.8 MPa
Counting Statistics Stress Error (+/-):	1.1 KSI	7.8 MPa
Probable error.....(+/-):	1.9 KSI	12.8 MPa



===== TEC Stress Analyzer v1.64 =====  
 ===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7677.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 17 / 0.15" from Hole / Longitudinal  
 Circumferential with respect to Hole / ebm

Acquisition date & time: 10/28/2005 1:17pm

Material [hkl].....: Al 5083-H23 [333]  
 Depth.....: 0.0000000  
 Phi angle.....: 0.00  
 Collimator.....: Round\_4mm  
 Bracket.....: 160s  
 Peak Bounding Range [percent].....: 20  
 X-ray Target Description and Wavelength: copper 1.54056  
 PSI Oscillation Angle Range.....: 2.00  
 Spectra count time (PSI=0).....: 20.0  
 High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
 ADC Channels Full Scale.....: 256  
 Detector Calibration Coefficients:  
 A 1.99867E-07 B -7.91049E-05 C 0.0688651 D 148.0028

Psi	Sin <sup>2</sup> (psi)	Pk Chan	Intens	FWHM	Kalp Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00020	161.69	1211.8	4.67	0.27666	161.64	0.780278	0.000045
5.0	0.00538	160.86	1213.9	4.33	0.27411	161.59	0.780329	0.000045
10.0	0.02593	158.71	1252.2	4.12	0.27122	161.47	0.780465	0.000047
15.0	0.05955	163.62	1349.0	4.45	0.27716	161.75	0.780153	0.000050
20.0	0.10748	163.16	1254.7	4.58	0.27761	161.72	0.780183	0.000052
25.0	0.16778	161.66	1343.5	4.22	0.27401	161.64	0.780276	0.000050
30.0	0.23758	161.98	1706.4	4.12	0.27374	161.66	0.780255	0.000033
35.0	0.31472	163.56	1686.9	4.18	0.27533	161.75	0.780154	0.000033
40.0	0.39608	167.79	1601.6	3.96	0.27812	162.00	0.779887	0.000037
45.0	0.48193	169.11	1115.0	4.37	0.28159	162.07	0.779806	0.000065

Fitted Delta D vs Sin<sup>2</sup>(psi) Data:

D Spacing Intercept.....: 0.780355  
 Slope of Fitted Line.....: -0.0009821  
 Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -10.0 KSI -69.1 MPa

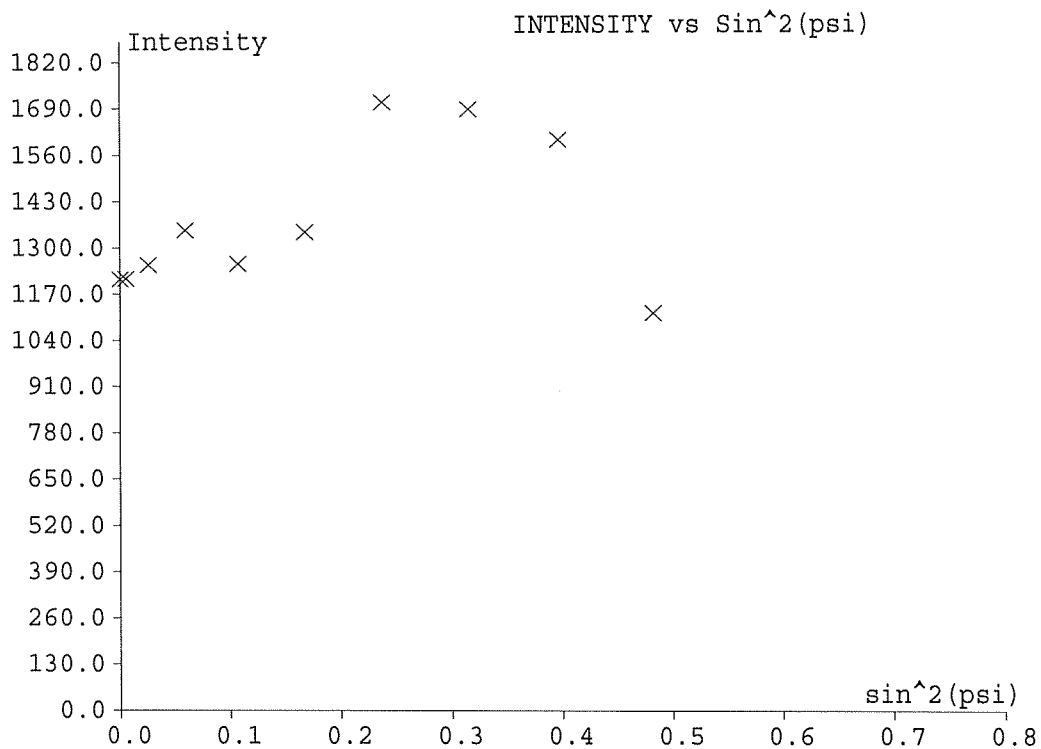
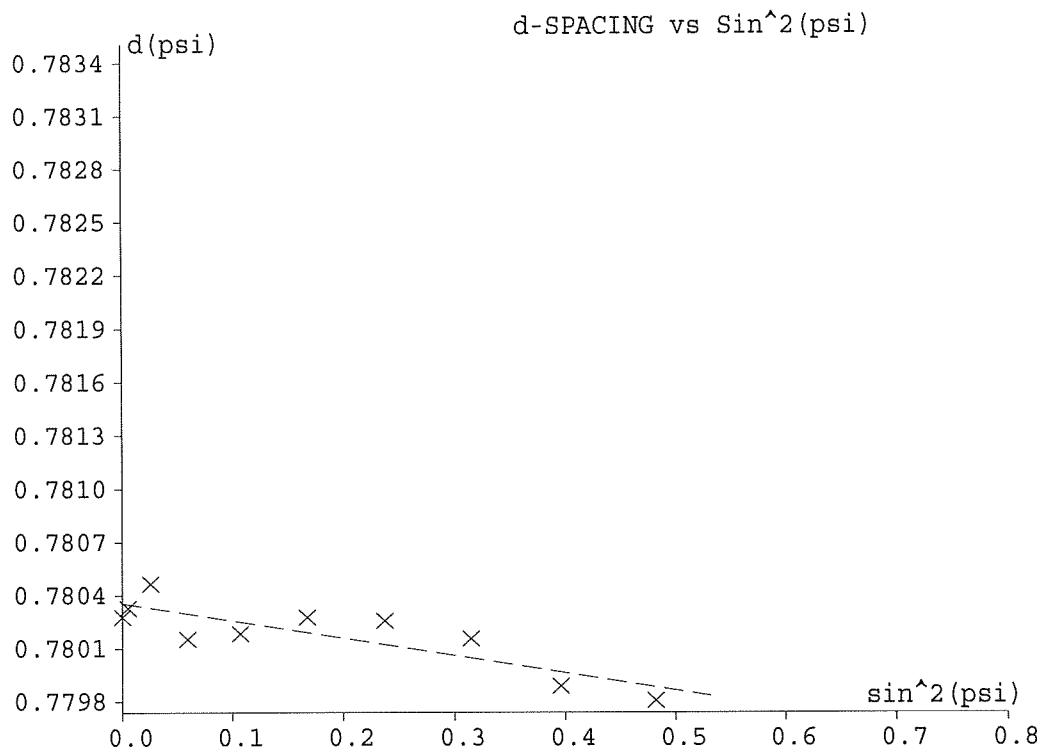
Counting Statistics Stress Error (+/-): 1.0 KSI 7.0 MPa  
 Probable error.....(+/-): 2.2 KSI 15.2 MPa

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7677.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 17 / 0.15" from Hole / Longitudinal  
Circumferential with respect to Hole / ebm

*Residual Stress.....	-10.0 KSI	-69.1 MPa
Counting Statistics Stress Error (+/-):	1.0 KSI	7.0 MPa
Probable error.....(+/-):	2.2 KSI	15.2 MPa



===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7672.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 18 / 0.05" from Hole / Longitudinal  
Circumferential with respect to Hole / ebm

Acquisition date & time: 10/28/2005 0:48pm

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 20.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A 1.99867E-07 B -7.91049E-05 C 0.0688651 D 148.0028

Psi	Sin <sup>2</sup> (psi)	Pk Chan	Intens	FWHM	Kalp Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00006	149.05	1137.5	4.68	0.26664	160.90	0.781101	0.000058
5.0	0.00631	148.74	1063.6	4.37	0.26493	160.89	0.781119	0.000048
10.0	0.02751	149.02	1459.2	4.36	0.26509	160.90	0.781101	0.000042
15.0	0.06208	153.16	1173.8	4.30	0.26796	161.14	0.780828	0.000052
20.0	0.11026	154.38	927.4	4.70	0.27090	161.21	0.780750	0.000076
25.0	0.16845	159.93	890.7	4.35	0.27354	161.54	0.780388	0.000082
30.0	0.23804	160.93	1280.1	4.17	0.27317	161.60	0.780323	0.000055
35.0	0.31185	169.68	1320.7	4.28	0.28163	162.11	0.779770	0.000046
40.0	0.39524	169.52	1215.4	4.44	0.28241	162.09	0.779781	0.000057
45.0	0.47534	182.02	696.4	4.58	0.29464	162.83	0.779012	0.000062

Fitted Delta D vs Sin<sup>2</sup>(psi) Data:

D Spacing Intercept.....: 0.781154  
Slope of Fitted Line.....: -0.004105  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -41.9 KSI -288.7 MPa

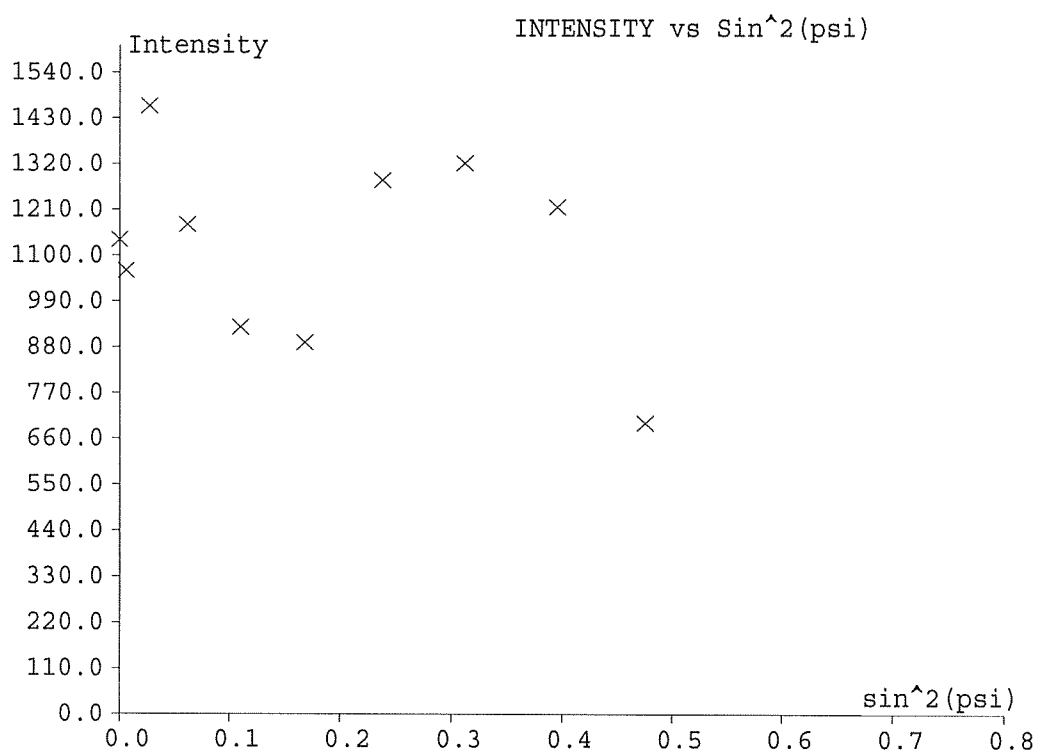
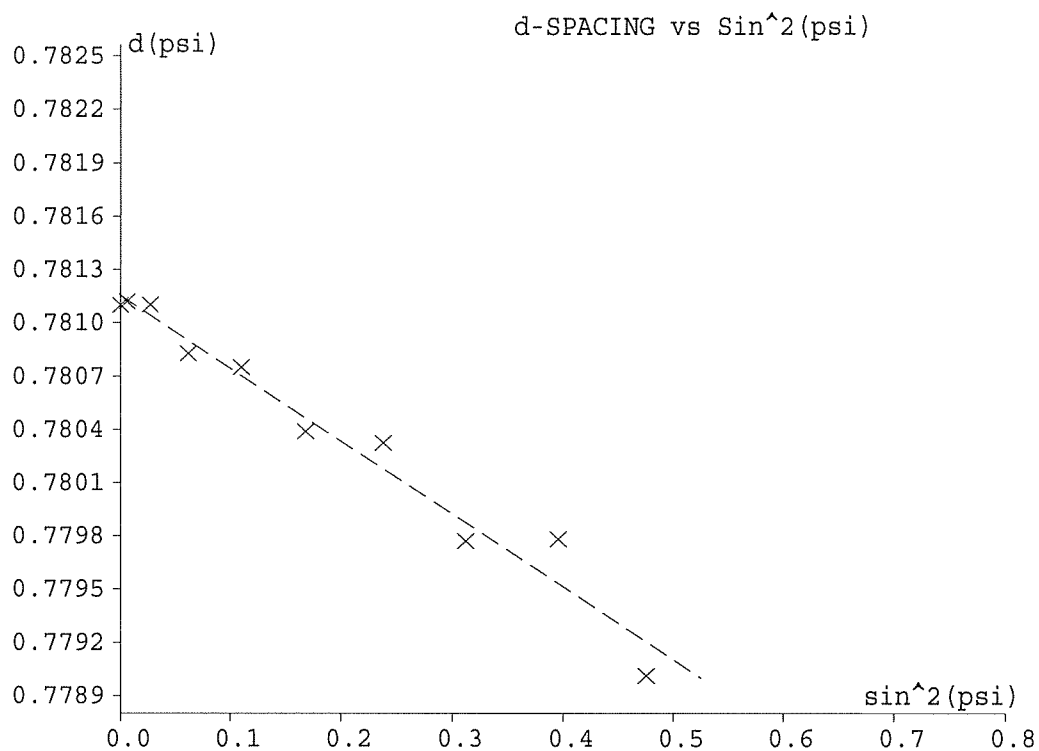
Counting Statistics Stress Error (+/-): 1.1 KSI 7.8 MPa  
Probable error.....(+/-): 2.7 KSI 18.9 MPa

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7672.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 18 / 0.05" from Hole / Longitudinal  
Circumferential with respect to Hole / ebm

*Residual Stress.....:	-41.9 KSI	-288.7 MPa
Counting Statistics Stress Error (+/-):	1.1 KSI	7.8 MPa
Probable error.....(+/-):	2.7 KSI	18.9 MPa





===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7673.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 18 / 0.10" from Hole / Longitudinal  
Circumferential with respect to Hole / ebm

Acquisition date & time: 10/28/2005 0:54pm

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 20.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A 1.99867E-07 B -7.91049E-05 C 0.0688651 D 148.0028

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00011	154.26	1278.1	4.57	0.27051	161.21	0.780757	0.000056
5.0	0.00580	155.26	1413.8	4.53	0.27107	161.26	0.780692	0.000049
10.0	0.02668	154.09	1306.4	4.44	0.26959	161.20	0.780767	0.000045
15.0	0.06168	154.76	1455.1	4.12	0.26816	161.24	0.780722	0.000036
20.0	0.10906	158.13	1194.3	4.20	0.27118	161.43	0.780503	0.000041
25.0	0.16915	158.05	1334.3	4.19	0.27101	161.43	0.780508	0.000042
30.0	0.23830	160.31	1411.4	3.99	0.27183	161.56	0.780362	0.000036
35.0	0.31570	161.48	1578.9	3.96	0.27261	161.63	0.780286	0.000037
40.0	0.39812	163.68	1417.4	4.14	0.27522	161.76	0.780147	0.000030
45.0	0.47750	177.80	816.7	4.57	0.29047	162.58	0.779269	0.000053

Fitted Delta D vs Sin^2(psi) Data:

D Spacing Intercept.....: 0.780831  
Slope of Fitted Line.....: -0.002383  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -24.3 KSI -167.7 MPa

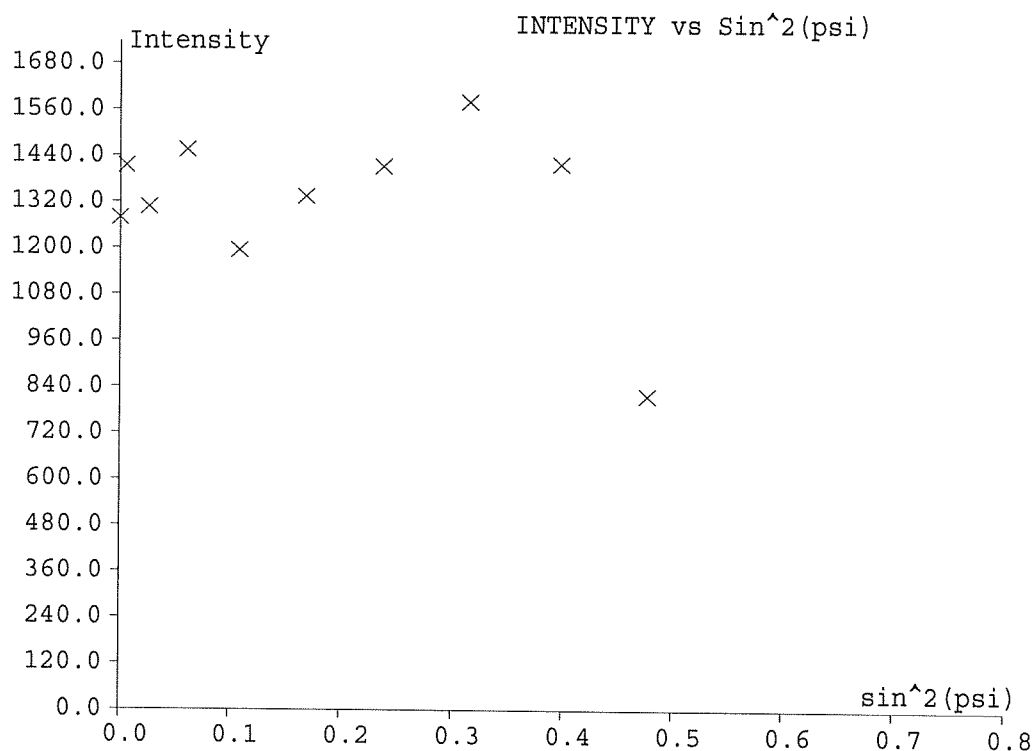
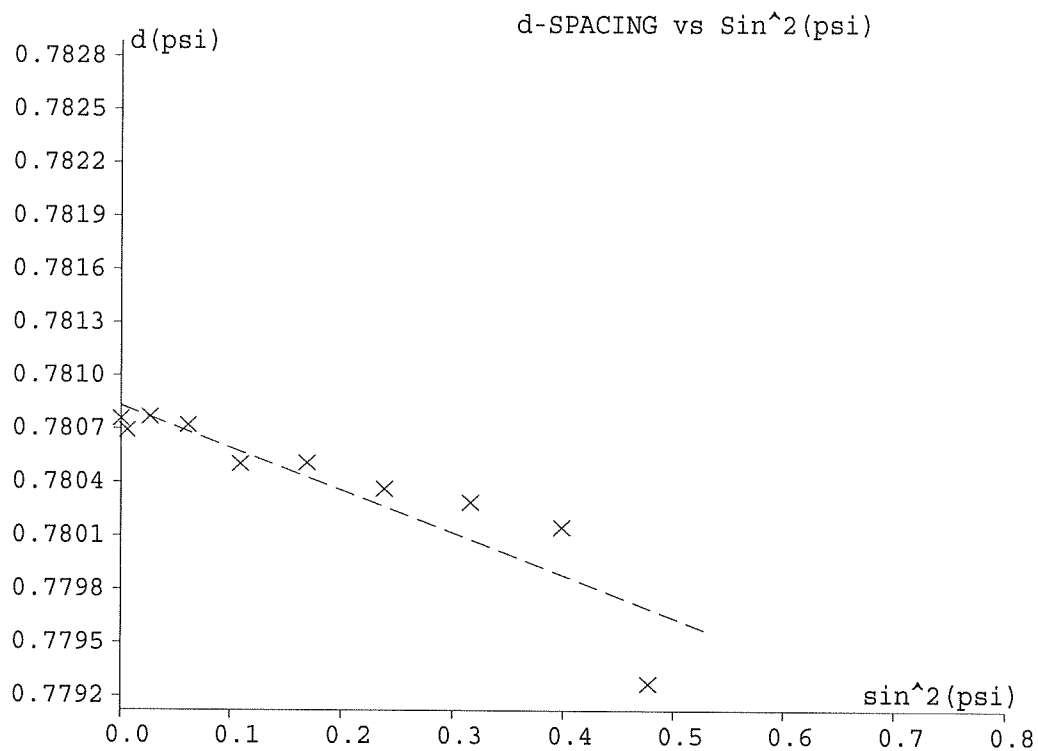
Counting Statistics Stress Error (+/-): 0.9 KSI 6.4 MPa  
Probable error.....(+/-): 4.1 KSI 28.1 MPa

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7673.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 18 / 0.10" from Hole / Longitudinal  
Circumferential with respect to Hole / ebm

*Residual Stress.....:	-24.3 KSI	-167.7 MPa
Counting Statistics Stress Error (+/-):	0.9 KSI	6.4 MPa
Probable error.....(+/-):	4.1 KSI	28.1 MPa



===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7674.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 18 / 0.15" from Hole / Longitudinal  
Circumferential with respect to Hole / ebm

Acquisition date & time: 10/28/2005 0:59pm

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 20.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A 1.99867E-07 B -7.91049E-05 C 0.0688651 D 148.0028

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00017	159.52	1172.9	4.28	0.27274	161.51	0.780414	0.000045
5.0	0.00559	157.92	1335.9	4.23	0.27117	161.42	0.780517	0.000040
10.0	0.02587	159.09	1495.0	4.52	0.27403	161.49	0.780444	0.000041
15.0	0.06080	158.38	1266.7	3.92	0.27002	161.45	0.780486	0.000043
20.0	0.10817	160.98	1281.4	4.55	0.27568	161.60	0.780322	0.000050
25.0	0.16861	159.49	1287.6	4.18	0.27207	161.51	0.780415	0.000035
30.0	0.23754	162.05	1609.0	3.94	0.27295	161.66	0.780250	0.000029
35.0	0.31586	161.14	1738.3	3.88	0.27196	161.61	0.780308	0.000028
40.0	0.39838	163.14	1452.4	3.88	0.27349	161.73	0.780180	0.000029
45.0	0.48265	167.69	868.2	4.34	0.28012	161.99	0.779895	0.000055

Fitted Delta D vs Sin^2(psi) Data:

D Spacing Intercept.....: 0.780496  
Slope of Fitted Line.....: -0.0009599  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -9.8 KSI -67.6 MPa

Counting Statistics Stress Error (+/-): 0.9 KSI 6.1 MPa  
Probable error.....(+/-): 1.7 KSI 11.7 MPa

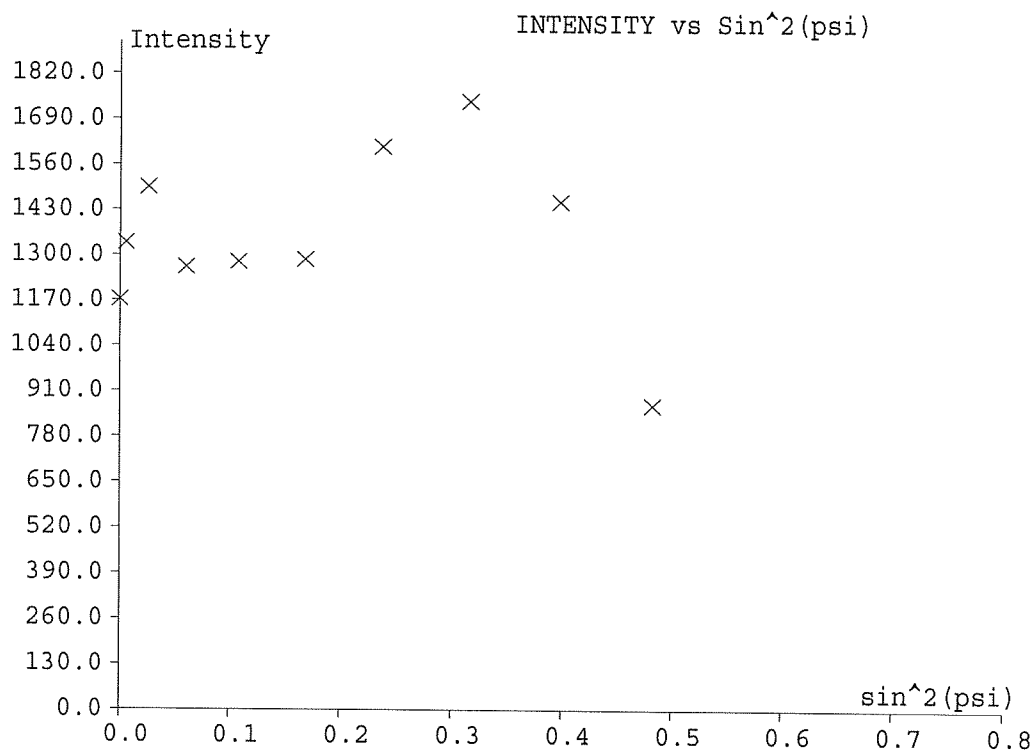
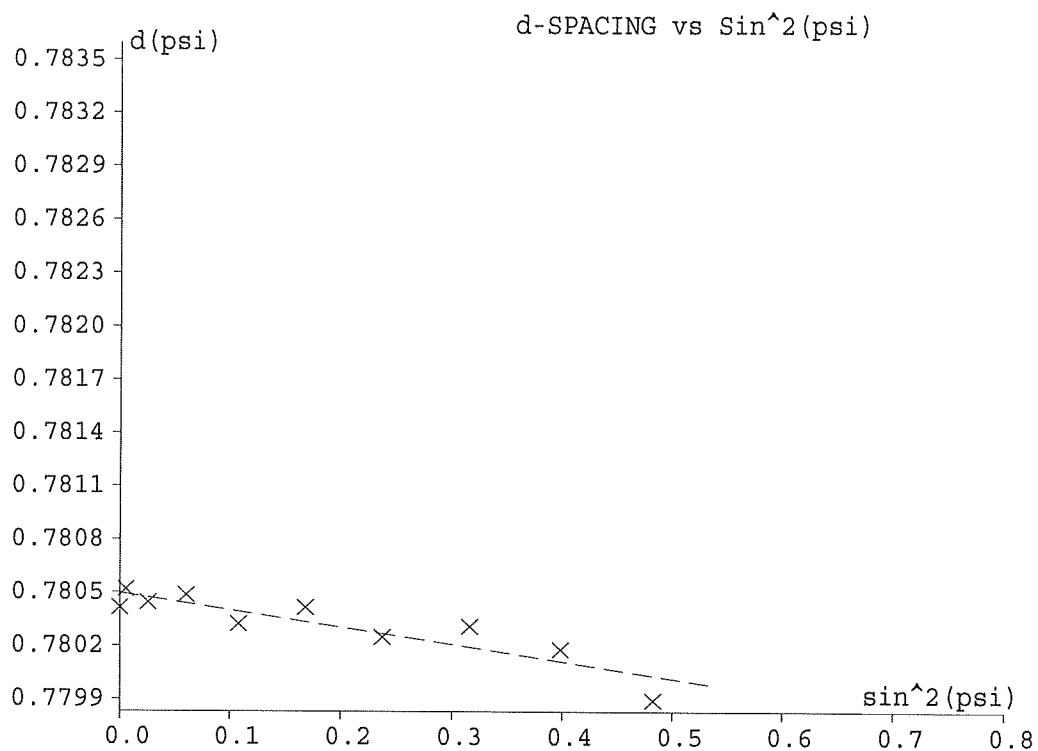
Warning: Counting statistics may be the controlling error!

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7674.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 18 / 0.15" from Hole / Longitudinal  
Circumferential with respect to Hole / ebm

*Residual Stress.....:	-9.8 KSI	-67.6 MPa
Counting Statistics Stress Error (+/-):	0.9 KSI	6.1 MPa
Probable error.....(+/-):	1.7 KSI	11.7 MPa



===== TEC Stress Analyzer v1.64 =====  
 ===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7669.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 19 / 0.05" from Hole / Longitudinal  
 Circumferential with respect to Hole / ebm

Acquisition date & time: 10/28/2005 0:32pm

Material [hkl].....: Al 5083-H23 [333]  
 Depth.....: 0.0000000  
 Phi angle.....: 0.00  
 Collimator.....: Round\_4mm  
 Bracket.....: 160s  
 Peak Bounding Range [percent].....: 20  
 X-ray Target Description and Wavelength: copper 1.54056  
 PSI Oscillation Angle Range.....: 2.00  
 Spectra count time (PSI=0).....: 20.0  
 High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
 ADC Channels Full Scale.....: 256  
 Detector Calibration Coefficients:  
 A 1.99867E-07 B -7.91049E-05 C 0.0688651 D 148.0028

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00006	148.63	935.4	4.96	0.26675	160.88	0.781129	0.000070
5.0	0.00622	149.89	985.0	4.76	0.26743	160.95	0.781045	0.000070
10.0	0.02766	148.18	1183.7	4.77	0.26610	160.85	0.781159	0.000061
15.0	0.06201	153.46	1114.7	4.35	0.26849	161.16	0.780808	0.000057
20.0	0.10907	158.13	1095.4	4.72	0.27392	161.43	0.780506	0.000066
25.0	0.16993	156.01	1229.2	4.21	0.26957	161.31	0.780641	0.000048
30.0	0.23782	161.47	1318.2	4.49	0.27570	161.63	0.780291	0.000046
35.0	0.31291	167.46	1279.3	4.54	0.28115	161.97	0.779911	0.000055
40.0	0.39302	173.96	979.8	4.41	0.28623	162.35	0.779504	0.000060
45.0	0.47777	177.25	765.2	4.43	0.28933	162.55	0.779302	0.000058

Fitted Delta D vs Sin^2(psi) Data:

D Spacing Intercept.....: 0.781125  
 Slope of Fitted Line.....: -0.003871  
 Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -39.5 KSI -272.3 MPa

Counting Statistics Stress Error (+/-): 1.2 KSI 8.5 MPa

Probable error.....(+/-): 2.4 KSI 16.6 MPa

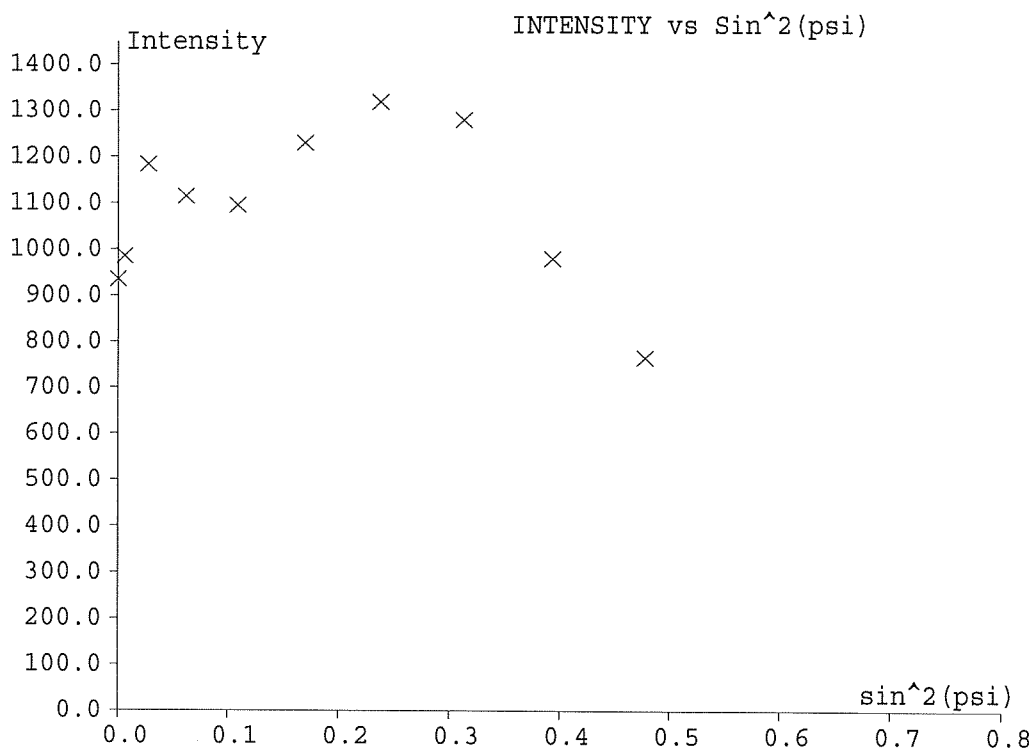
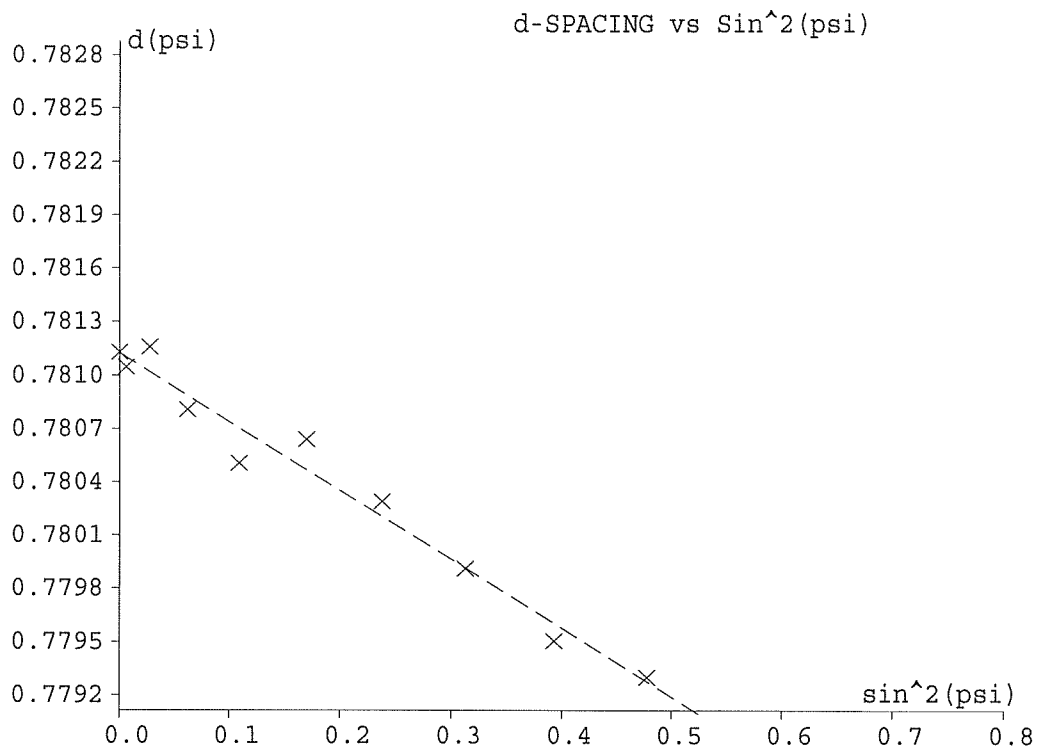
Warning: Counting statistics may be the controlling error!

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7669.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 19 / 0.05" from Hole / Longitudinal  
Circumferential with respect to Hole / ebm

*Residual Stress.....:	-39.5 KSI	-272.3 MPa
Counting Statistics Stress Error (+/-):	1.2 KSI	8.5 MPa
Probable error.....(+/-):	2.4 KSI	16.6 MPa



===== TEC Stress Analyzer v1.64 =====  
 ===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7670.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 19 / 0.10" from Hole / Longitudinal  
 Circumferential with respect to Hole / ebm

Acquisition date & time: 10/28/2005 0:37pm

Material [hkl].....: Al 5083-H23 [333]  
 Depth.....: 0.0000000  
 Phi angle.....: 0.00  
 Collimator.....: Round\_4mm  
 Bracket.....: 160s  
 Peak Bounding Range [percent].....: 20  
 X-ray Target Description and Wavelength: copper 1.54056  
 PSI Oscillation Angle Range.....: 2.00  
 Spectra count time (PSI=0).....: 20.0  
 High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
 ADC Channels Full Scale.....: 256  
 Detector Calibration Coefficients:  
 A 1.99867E-07 B -7.91049E-05 C 0.0688651 D 148.0028

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp Cor	A	2-Theta	D Spacing	St. Dev.
0.0	0.00011	154.29	1233.9	4.71	0.27084		161.21	0.780756	0.000057
5.0	0.00624	149.56	1378.2	4.50	0.26640		160.94	0.781066	0.000057
10.0	0.02739	149.76	1517.5	4.61	0.26710		160.95	0.781053	0.000040
15.0	0.06206	153.23	1321.9	4.19	0.26732		161.15	0.780822	0.000043
20.0	0.10970	156.13	1278.6	4.53	0.27172		161.32	0.780635	0.000040
25.0	0.16926	157.77	1451.5	4.23	0.27108		161.41	0.780526	0.000043
30.0	0.23892	158.88	1567.3	4.18	0.27159		161.48	0.780455	0.000034
35.0	0.31438	164.30	1561.4	4.31	0.27683		161.79	0.780108	0.000040
40.0	0.39640	167.14	1230.7	4.04	0.27794		161.96	0.779928	0.000035
45.0	0.47951	173.85	932.3	4.29	0.28553		162.35	0.779510	0.000053

Fitted Delta D vs Sin^2(psi) Data:

D Spacing Intercept.....: 0.781002  
 Slope of Fitted Line.....: -0.002861  
 Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -29.2 KSI -201.3 MPa

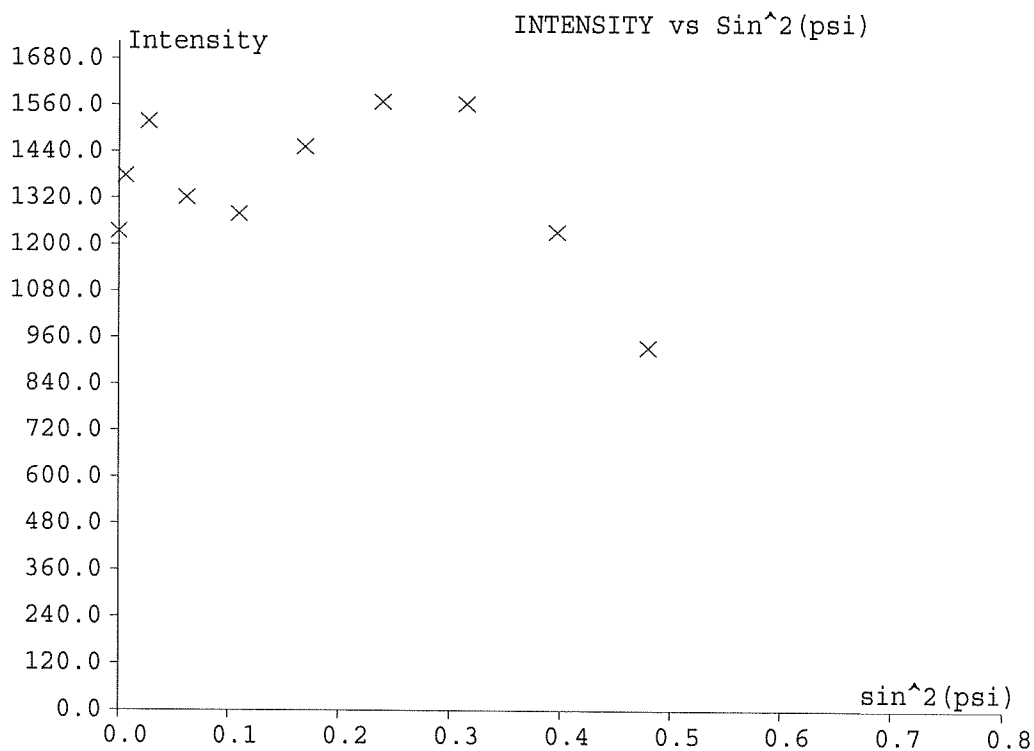
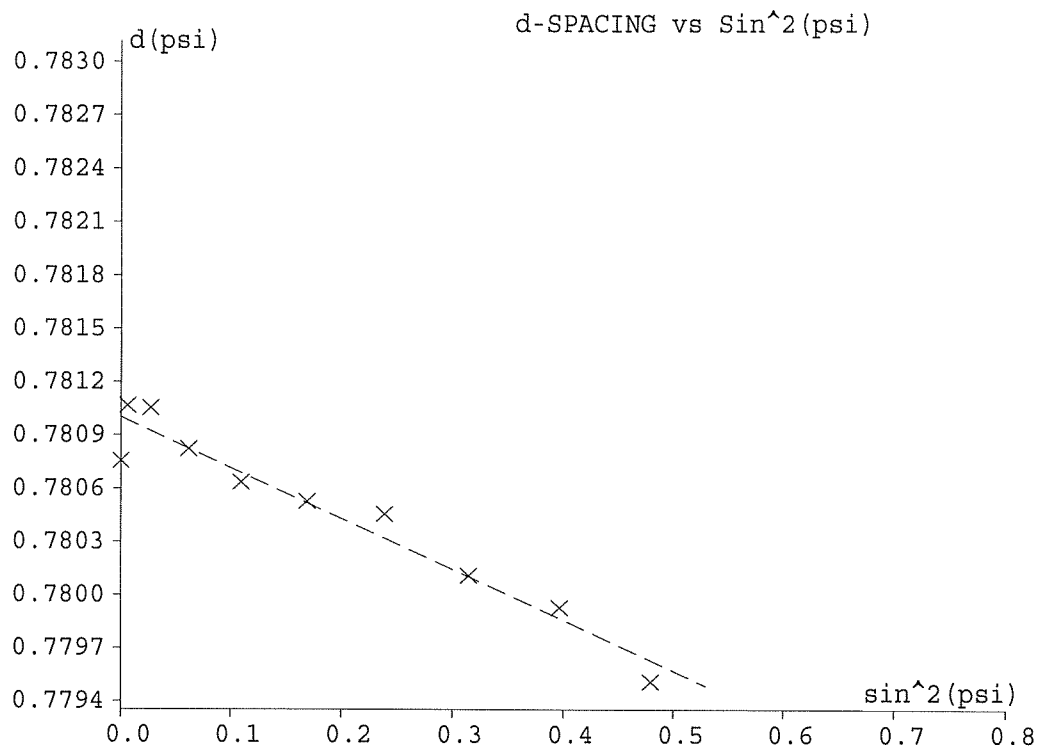
Counting Statistics Stress Error (+/-): 1.0 KSI 6.6 MPa  
 Probable error.....(+/-): 2.5 KSI 17.0 MPa

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7670.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 19 / 0.10" from Hole / Longitudinal  
Circumferential with respect to Hole / ebm

*Residual Stress.....:	-29.2 KSI	-201.3 MPa
Counting Statistics Stress Error (+/-):	1.0 KSI	6.6 MPa
Probable error.....(+/-):	2.5 KSI	17.0 MPa





===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7671.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 19 / 0.15" from Hole / Longitudinal  
Circumferential with respect to Hole / ebm

Acquisition date & time: 10/28/2005 0:42pm

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 20.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A 1.99867E-07 B -7.91049E-05 C 0.0688651 D 148.0028

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00017	159.37	1202.3	4.54	0.27435	161.50	0.780426	0.000053
5.0	0.00596	153.11	1287.3	4.21	0.26732	161.14	0.780830	0.000053
10.0	0.02664	154.36	1400.3	4.35	0.26919	161.21	0.780749	0.000052
15.0	0.06131	156.33	1363.8	4.27	0.27022	161.33	0.780620	0.000047
20.0	0.10935	157.22	1377.9	4.27	0.27087	161.38	0.780563	0.000040
25.0	0.16795	161.23	1332.1	4.23	0.27376	161.61	0.780304	0.000043
30.0	0.23880	159.13	1536.3	3.88	0.27043	161.49	0.780437	0.000040
35.0	0.31381	165.49	1788.5	3.94	0.27593	161.86	0.780031	0.000031
40.0	0.39755	164.80	1397.6	3.80	0.27451	161.82	0.780074	0.000028
45.0	0.48280	167.34	1101.8	3.92	0.27751	161.97	0.779914	0.000034

Fitted Delta D vs Sin^2(psi) Data:

D Spacing Intercept.....: 0.780690  
Slope of Fitted Line.....: -0.001636  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -16.7 KSI -115.2 MPa

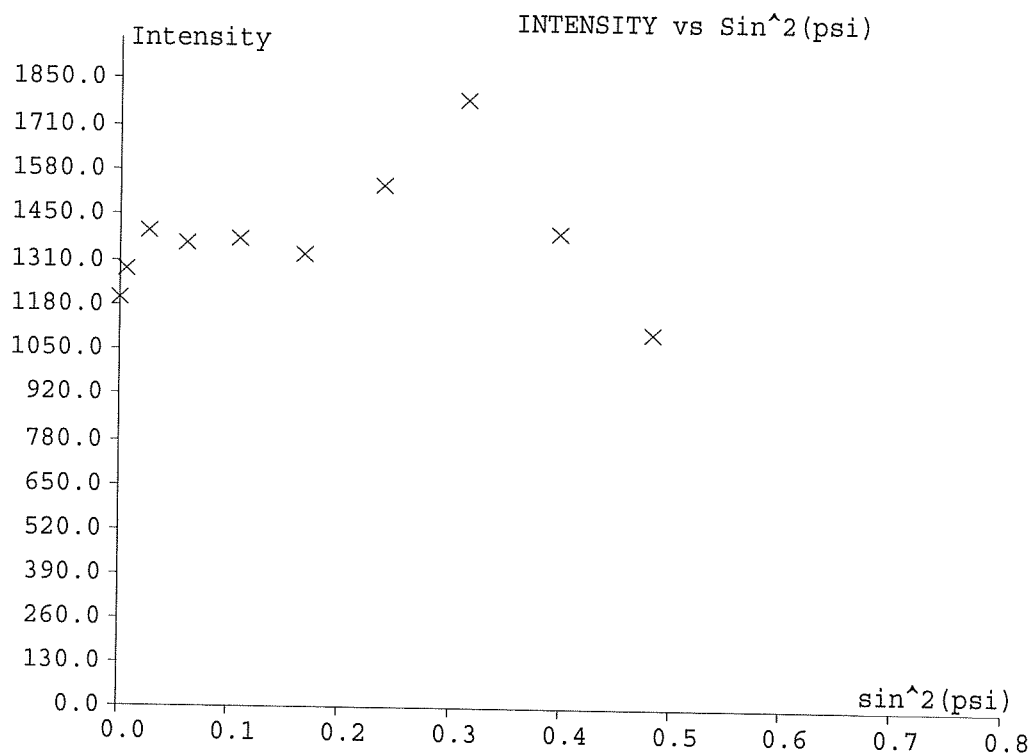
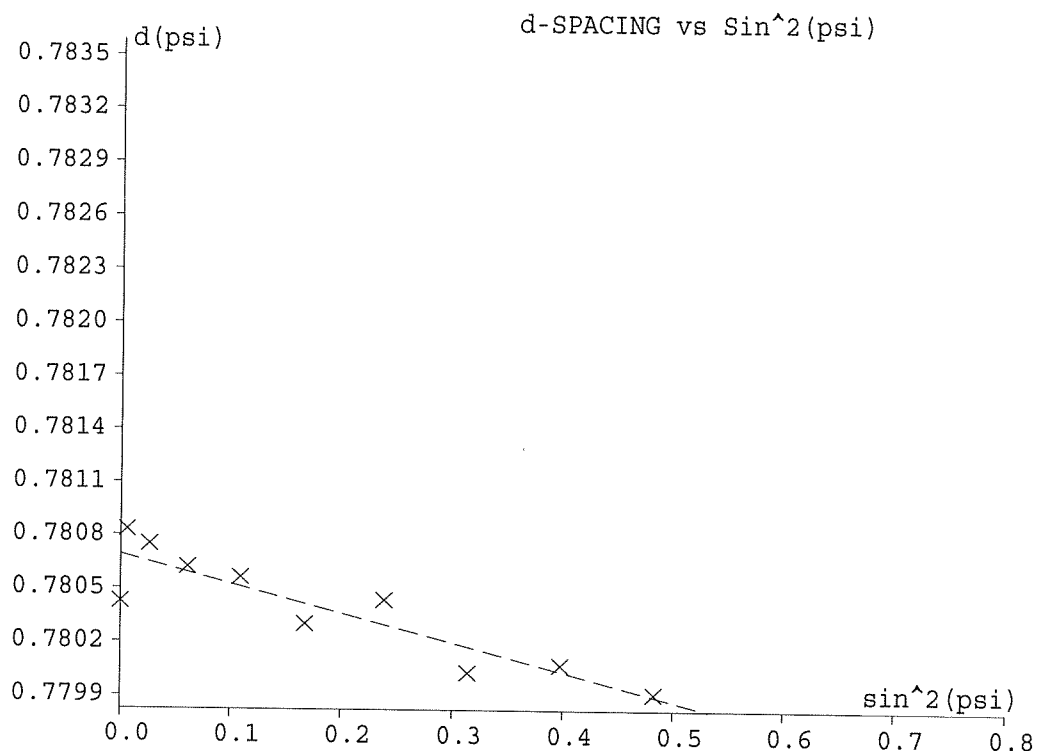
Counting Statistics Stress Error (+/-): 0.8 KSI 5.6 MPa  
Probable error.....(+/-): 2.8 KSI 19.3 MPa

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7671.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 19 / 0.15" from Hole / Longitudinal  
Circumferential with respect to Hole / ebm

*Residual Stress.....:	-16.7 KSI	-115.2 MPa
Counting Statistics Stress Error (+/-):	0.8 KSI	5.6 MPa
Probable error.....(+/-):	2.8 KSI	19.3 MPa



===== TEC Stress Analyzer v1.64 =====  
 ===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7666.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 20 / 0.05" from Hole / Longitudinal  
 Circumferential with respect to Hole / ebm

Acquisition date & time: 10/28/2005 0:15pm

Material [hkl].....: Al 5083-H23 [333]  
 Depth.....: 0.0000000  
 Phi angle.....: 0.00  
 Collimator.....: Round\_4mm  
 Bracket.....: 160s  
 Peak Bounding Range [percent].....: 20  
 X-ray Target Description and Wavelength: copper 1.54056  
 PSI Oscillation Angle Range.....: 2.00  
 Spectra count time (PSI=0).....: 20.0  
 High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
 ADC Channels Full Scale.....: 256  
 Detector Calibration Coefficients:  
 A 1.99867E-07 B -7.91049E-05 C 0.0688651 D 148.0028

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp Cor	A	2-Theta	D Spacing	St. Dev.
0.0	0.00007	149.77	859.3	5.24	0.26803	160.95	0.781054	0.000133	
5.0	0.00605	152.05	912.4	4.86	0.26932	161.08	0.780903	0.000067	
10.0	0.02651	155.18	1020.5	5.17	0.27249	161.26	0.780699	0.000067	
15.0	0.06141	155.95	1057.7	4.89	0.27249	161.30	0.780648	0.000059	
20.0	0.10881	158.95	973.7	4.87	0.27484	161.48	0.780454	0.000073	
25.0	0.16808	160.94	1053.7	4.61	0.27594	161.59	0.780325	0.000062	
30.0	0.23726	162.77	1186.5	4.80	0.27778	161.70	0.780208	0.000071	
35.0	0.31355	166.12	1667.7	4.89	0.28107	161.90	0.779996	0.000046	
40.0	0.39584	168.29	1877.7	4.38	0.28090	162.02	0.779858	0.000032	
45.0	0.47588	180.93	794.9	4.36	0.29249	162.76	0.779077	0.000050	

Fitted Delta D vs Sin^2(psi) Data:

D Spacing Intercept.....: 0.780912  
 Slope of Fitted Line.....: -0.003289  
 Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -33.6 KSI -231.4 MPa

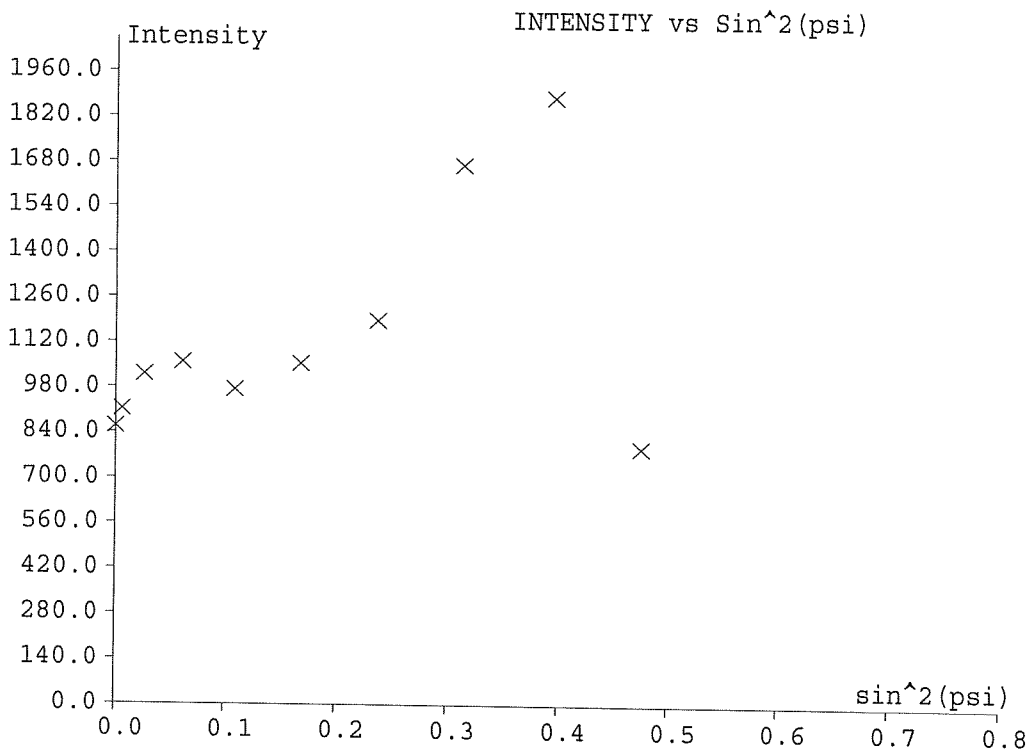
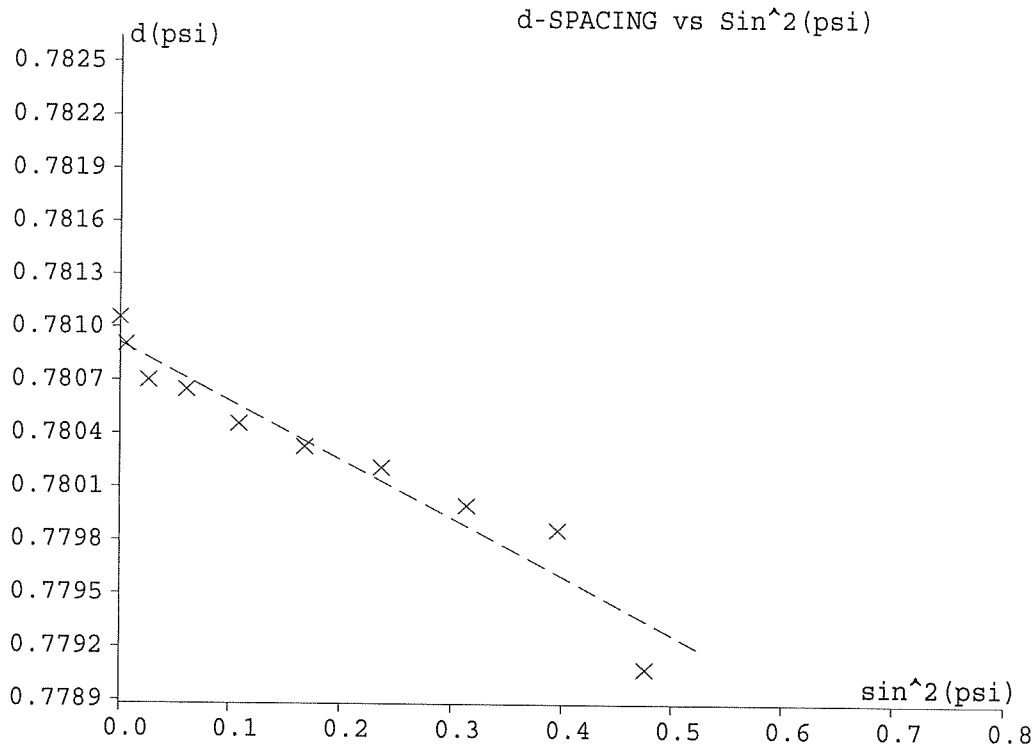
Counting Statistics Stress Error (+/-): 1.4 KSI 9.4 MPa  
 Probable error.....(+/-): 3.2 KSI 22.0 MPa

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7666.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 20 / 0.05" from Hole / Longitudinal  
Circumferential with respect to Hole / ebm

*Residual Stress.....:	-33.6 KSI	-231.4 MPa
Counting Statistics Stress Error (+/-):	1.4 KSI	9.4 MPa
Probable error.....(+/-):	3.2 KSI	22.0 MPa



===== TEC Stress Analyzer v1.64 =====  
 ===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7667.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 20 / 0.10" from Hole / Longitudinal  
 Circumferential with respect to Hole / ebm

Acquisition date & time: 10/28/2005 0:21pm

Material [hkl].....: Al 5083-H23 [333]  
 Depth.....: 0.0000000  
 Phi angle.....: 0.00  
 Collimator.....: Round\_4mm  
 Bracket.....: 160s  
 Peak Bounding Range [percent].....: 20  
 X-ray Target Description and Wavelength: copper 1.54056  
 PSI Oscillation Angle Range.....: 2.00  
 Spectra count time (PSI=0).....: 20.0  
 High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
 ADC Channels Full Scale.....: 256  
 Detector Calibration Coefficients:  
 A 1.99867E-07 B -7.91049E-05 C 0.0688651 D 148.0028

Psi	Sin <sup>2</sup> (psi)	Pk Chan	Intens	FWHM	Kalp	Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00009	152.40	1068.1	5.08	0.26998		161.10	0.780880	0.000071
5.0	0.00587	154.34	1096.0	4.54	0.27038		161.21	0.780752	0.000054
10.0	0.02594	158.70	1223.8	4.56	0.27399		161.46	0.780469	0.000051
15.0	0.06097	157.76	1248.6	4.82	0.27381		161.41	0.780531	0.000051
20.0	0.10869	159.32	1413.5	4.56	0.27442		161.50	0.780429	0.000059
25.0	0.16849	159.83	1140.9	4.62	0.27509		161.53	0.780396	0.000062
30.0	0.23755	162.08	1477.8	4.41	0.27563		161.66	0.780251	0.000038
35.0	0.31172	169.96	1668.7	4.50	0.28315		162.12	0.779754	0.000046
40.0	0.39108	177.85	1126.2	4.42	0.28984		162.58	0.779265	0.000046
45.0	0.47821	176.38	843.5	4.24	0.28765		162.50	0.779354	0.000041

Fitted Delta D vs Sin<sup>2</sup>(psi) Data:

D Spacing Intercept.....: 0.780775  
 Slope of Fitted Line.....: -0.003167  
 Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -32.3 KSI -222.9 MPa

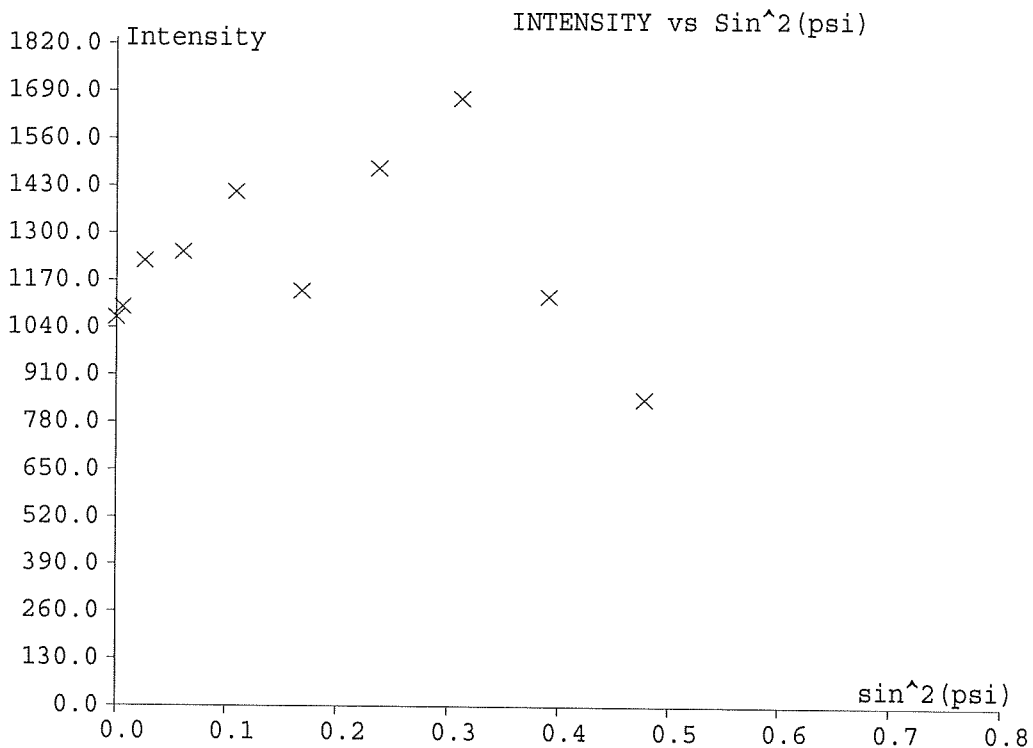
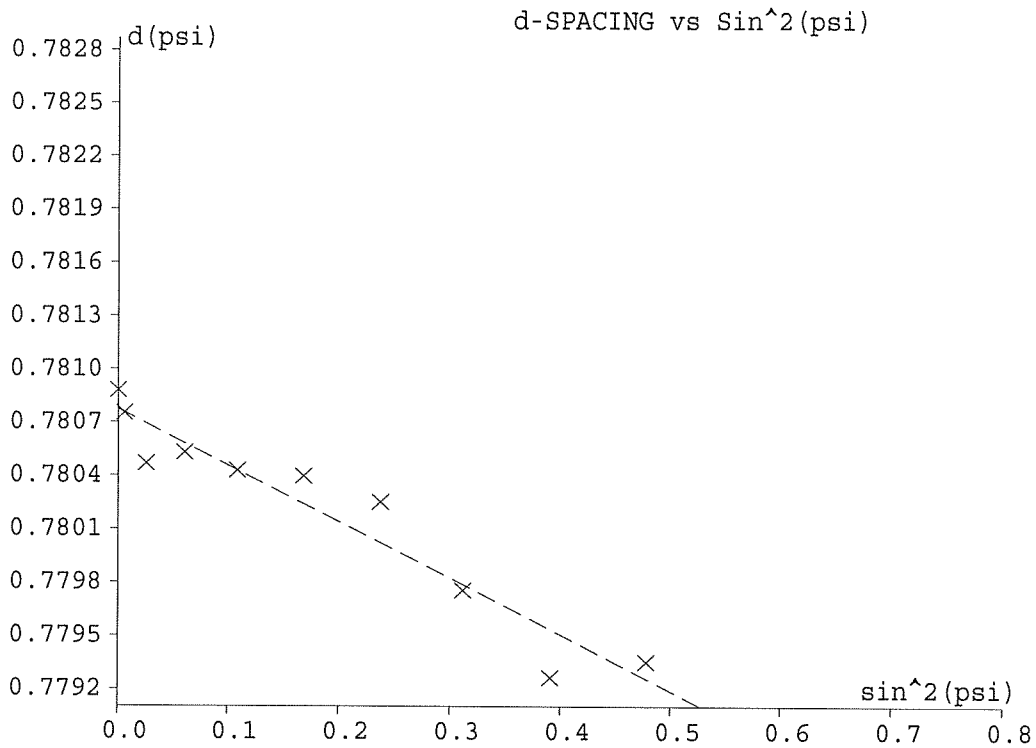
Counting Statistics Stress Error (+/-): 1.0 KSI 6.9 MPa  
 Probable error.....(+/-): 3.3 KSI 23.1 MPa

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7667.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 20 / 0.10" from Hole / Longitudinal  
Circumferential with respect to Hole / ebm

*Residual Stress.....:	-32.3 KSI	-222.9 MPa
Counting Statistics Stress Error (+/-):	1.0 KSI	6.9 MPa
Probable error.....(+/-):	3.3 KSI	23.1 MPa



===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7668.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 20 / 0.15" from Hole / Longitudinal  
Circumferential with respect to Hole / ebm

Acquisition date & time: 10/28/2005 0:26pm

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 20.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.50  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A 1.99867E-07 B -7.91049E-05 C 0.0688651 D 148.0028

Psi	Sin <sup>2</sup> (psi)	Pk Chan	Intens	FWHM	Kalp	Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00016	158.83	1175.4	4.97	0.27493		161.47	0.780461	0.000055
5.0	0.00557	158.28	1255.6	4.45	0.27289		161.44	0.780496	0.000039
10.0	0.02553	161.25	1628.7	4.53	0.27577		161.61	0.780305	0.000048
15.0	0.06072	158.79	1356.7	4.52	0.27380		161.47	0.780463	0.000041
20.0	0.10852	159.81	1308.8	3.94	0.27121		161.53	0.780394	0.000041
25.0	0.16903	158.38	1315.2	4.22	0.27144		161.45	0.780487	0.000038
30.0	0.23819	160.57	1816.2	4.04	0.27229		161.58	0.780345	0.000037
35.0	0.31285	167.57	1703.1	4.45	0.28071		161.98	0.779903	0.000042
40.0	0.39461	170.76	1122.9	4.29	0.28269		162.17	0.779703	0.000049
45.0	0.47787	177.05	1028.7	4.33	0.28869		162.54	0.779314	0.000086

Fitted Delta D vs Sin<sup>2</sup>(psi) Data:

D Spacing Intercept.....: 0.780574  
Slope of Fitted Line.....: -0.002157  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -22.0 KSI -151.8 MPa

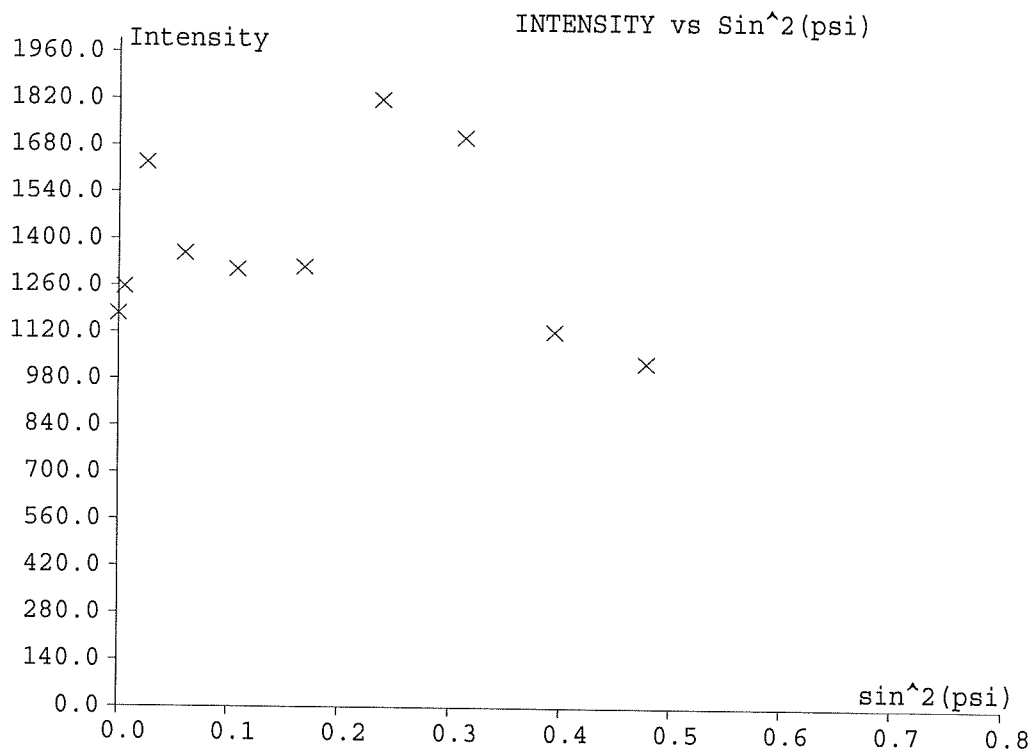
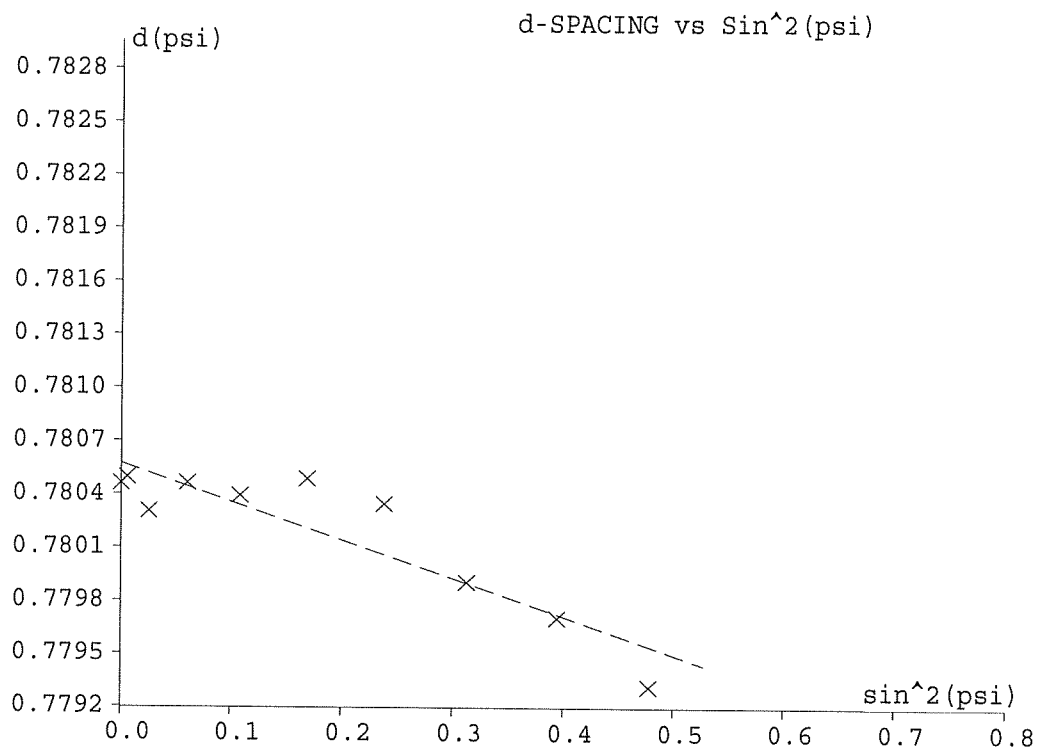
Counting Statistics Stress Error (+/-): 1.3 KSI 8.6 MPa  
Probable error.....(+/-): 3.7 KSI 25.6 MPa

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7668.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 20 / 0.15" from Hole / Longitudinal  
Circumferential with respect to Hole / ebm

*Residual Stress.....:	-22.0 KSI	-151.8 MPa
Counting Statistics Stress Error (+/-):	1.3 KSI	8.6 MPa
Probable error.....(+/-):	3.7 KSI	25.6 MPa





===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7771.STR  
Sample Description:  
SBIR / WP / CW Holes / AF Std 1 / Baseline / Longitudinal  
ebm

Acquisition date & time: 11/04/2005 5:26pm

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 20.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.00  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A 1.99867E-07 B -7.91049E-05 C 0.0688651 D 148.0028

Psi	Sin <sup>2</sup> (psi)	Pk Chan	Intens	FWHM	Kalp Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00018	160.25	792.6	4.06	0.27210	161.56	0.780366	0.000042
5.0	0.00546	159.68	841.4	4.02	0.27151	161.52	0.780402	0.000058
10.0	0.02581	159.41	873.1	3.72	0.26956	161.51	0.780418	0.000047
15.0	0.06050	159.65	873.7	4.00	0.27136	161.52	0.780404	0.000055
20.0	0.10619	167.27	898.4	4.41	0.28016	161.96	0.779922	0.000118
25.0	0.16736	162.75	978.8	3.86	0.27310	161.70	0.780205	0.000044
30.0	0.23627	164.98	1089.5	3.85	0.27499	161.83	0.780063	0.000040
35.0	0.31295	167.28	1220.7	3.72	0.27614	161.97	0.779917	0.000027
40.0	0.39391	172.12	828.1	3.93	0.28196	162.25	0.779615	0.000039
45.0	0.47901	174.80	593.5	4.10	0.28541	162.41	0.779450	0.000049

Fitted Delta D vs Sin<sup>2</sup>(psi) Data:

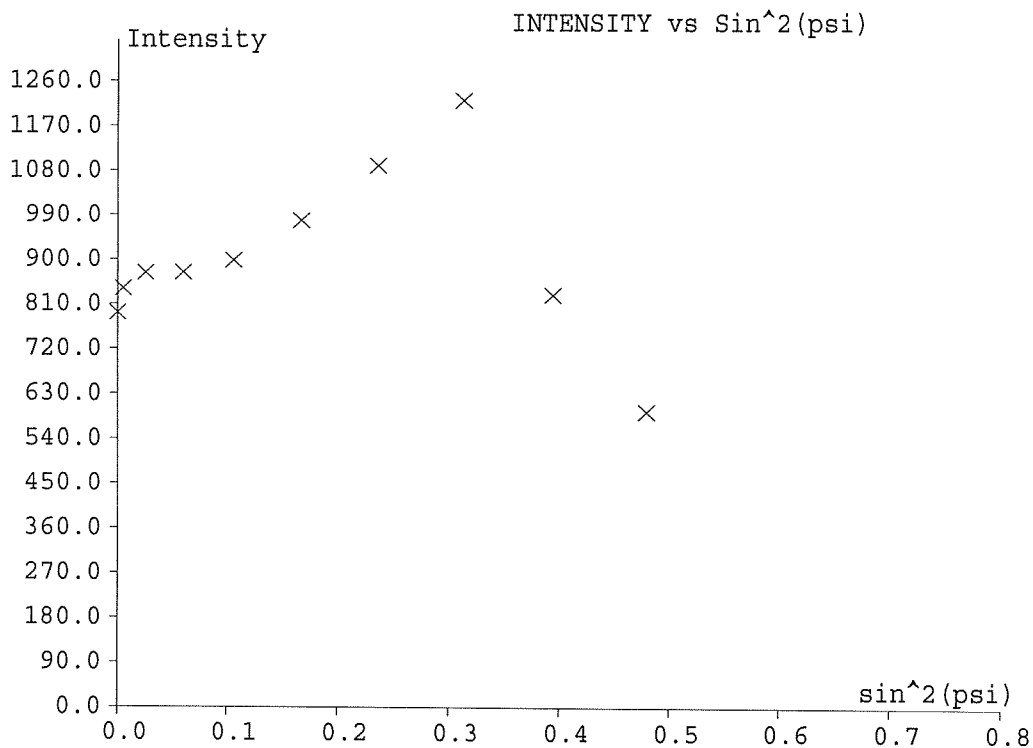
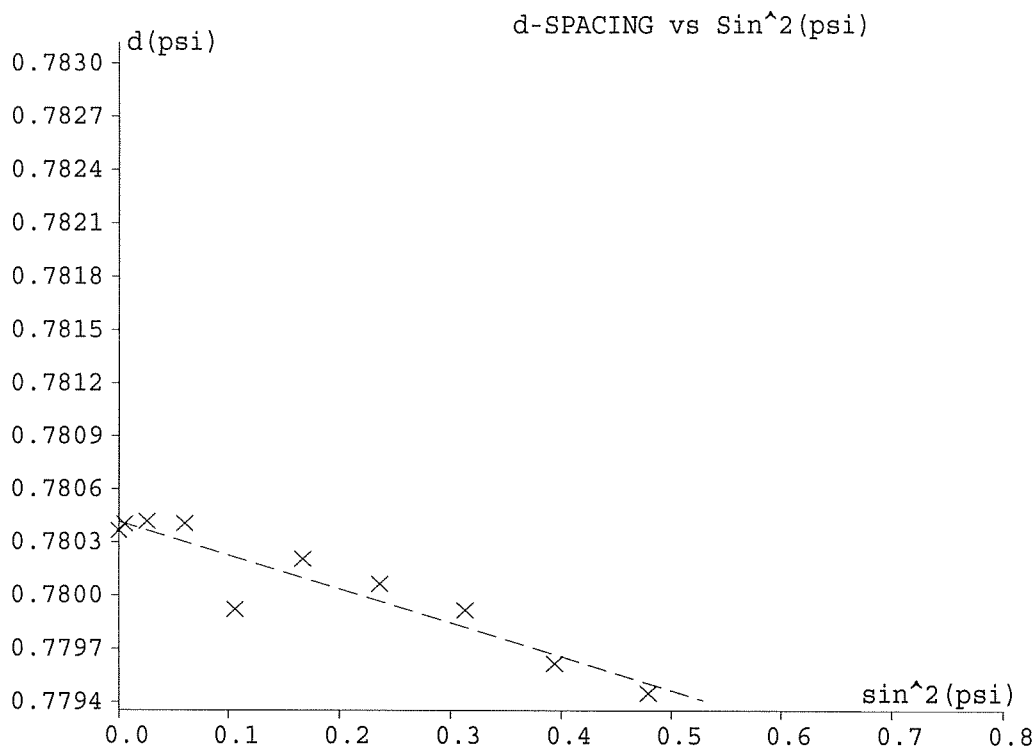
D Spacing Intercept.....: 0.780416  
Slope of Fitted Line.....: -0.0019  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -19.4 KSI -133.8 MPa

Counting Statistics Stress Error (+/-): 1.0 KSI 6.7 MPa  
Probable error.....(+/-): 2.6 KSI 18.0 MPa

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7771.STR  
Sample Description:  
SBIR / WP / CW Holes / AF Std 1 / Baseline / Longitudinal  
ebm

\*Residual Stress.....: -19.4 KSI -133.8 MPa  
Counting Statistics Stress Error (+/-): 1.0 KSI 6.7 MPa  
Probable error.....(+/-): 2.6 KSI 18.0 MPa



===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7772.STR  
Sample Description:  
SBIR / WP / CW Holes / AF Std 2 / Baseline / Longitudinal  
ebm

Acquisition date & time: 11/04/2005 5:31pm

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 20.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.00  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A 1.99867E-07 B -7.91049E-05 C 0.0688651 D 148.0028

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp	Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00022	162.65	703.0	3.91	0.27327		161.70	0.780211	0.000062
5.0	0.00502	165.65	834.3	3.74	0.27480		161.87	0.780020	0.000034
10.0	0.02514	163.66	824.3	4.21	0.27557		161.75	0.780149	0.000054
15.0	0.05939	164.24	1042.5	4.15	0.27578		161.79	0.780112	0.000049
20.0	0.10639	166.63	892.1	4.29	0.27887		161.93	0.779961	0.000052
25.0	0.16634	165.47	824.1	4.19	0.27714		161.86	0.780034	0.000046
30.0	0.23540	167.01	1276.7	3.91	0.27715		161.95	0.779935	0.000028
35.0	0.31452	163.96	1510.7	3.67	0.27281		161.78	0.780126	0.000026
40.0	0.39522	169.51	912.2	3.96	0.27973		162.10	0.779778	0.000033
45.0	0.48235	168.22	875.5	3.83	0.27786		162.02	0.779858	0.000033

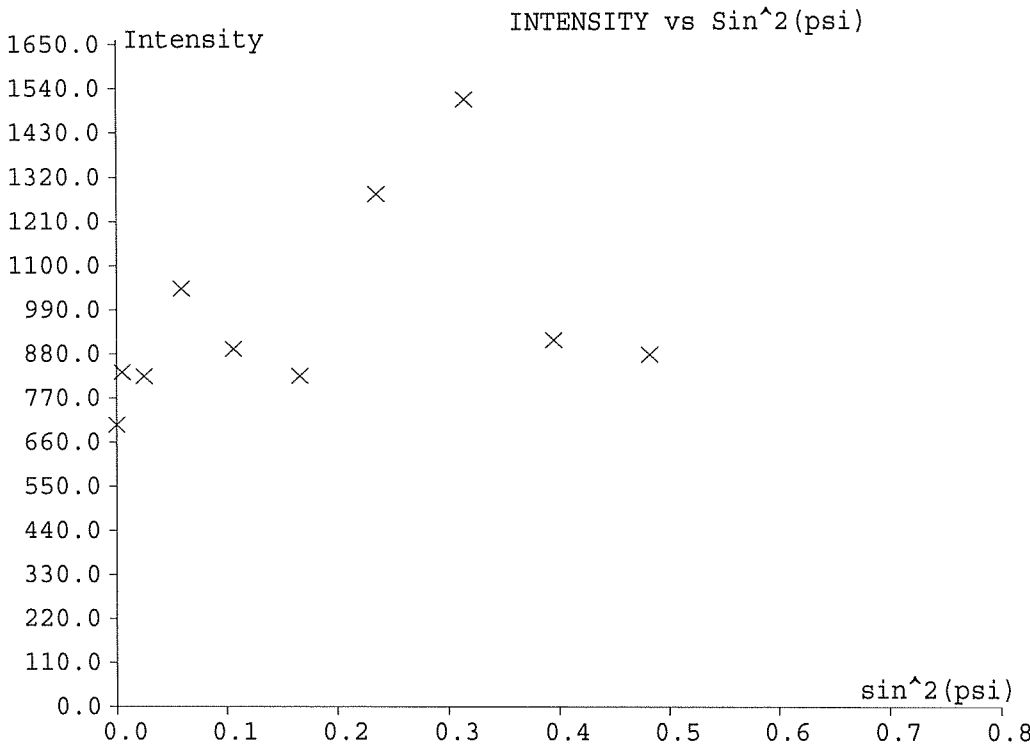
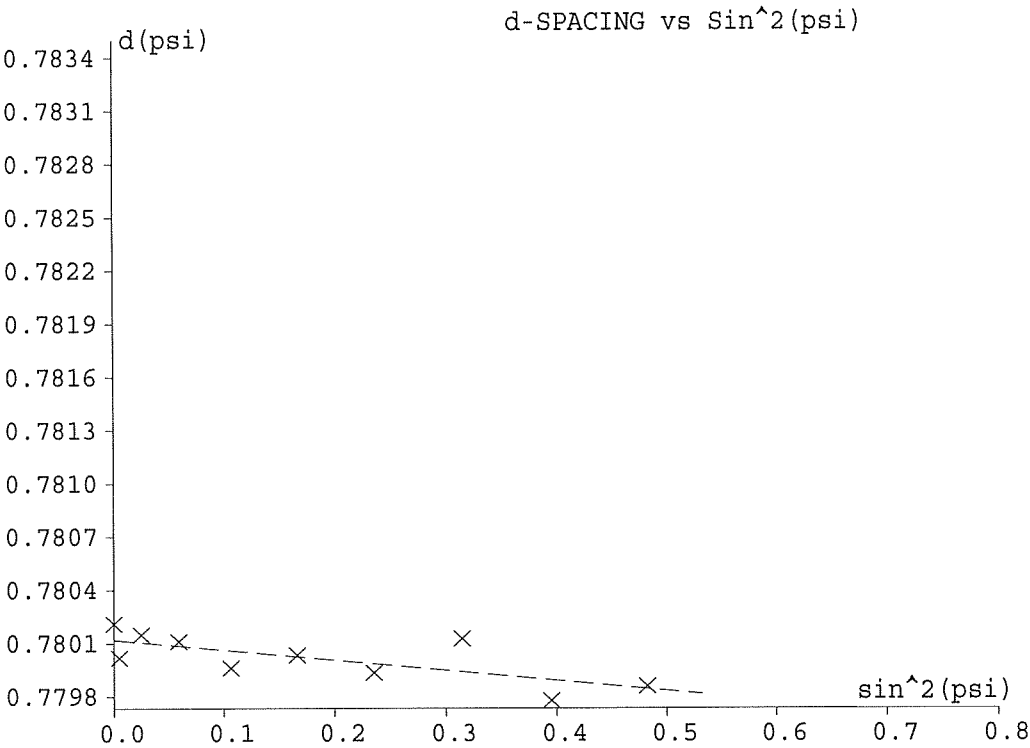
Fitted Delta D vs Sin^2(psi) Data:  
D Spacing Intercept.....: 0.780121  
Slope of Fitted Line.....: -0.000573  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -5.9 KSI -40.4 MPa

Counting Statistics Stress Error (+/-): 0.8 KSI 5.6 MPa  
Probable error.....(+/-): 2.0 KSI 13.7 MPa

Sample Description:  
SBIR / WP / CW Holes / AF Std 2 / Baseline / Longitudinal  
ebm

*Residual Stress.....:	-5.9 KSI	-40.4 MPa
Counting Statistics Stress Error (+/-):	0.8 KSI	5.6 MPa
Probable error.....(+/-):	2.0 KSI	13.7 MPa



===== TEC Stress Analyzer v1.64 =====  
 ===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7773.STR  
 Sample Description:  
 SBIR / WP / CW Holes / AF Std 3 / Baseline / Longitudinal  
 ebm

Acquisition date & time: 11/04/2005 5:37pm

Material [hkl].....: Al 5083-H23 [333]  
 Depth.....: 0.0000000  
 Phi angle.....: 0.00  
 Collimator.....: Round\_4mm  
 Bracket.....: 160s  
 Peak Bounding Range [percent].....: 20  
 X-ray Target Description and Wavelength: copper 1.54056  
 PSI Oscillation Angle Range.....: 2.00  
 Spectra count time (PSI=0).....: 20.0  
 High Voltage(kV) and Beam Current(mA)...: 45.00 1.00  
 ADC Channels Full Scale.....: 256  
 Detector Calibration Coefficients:  
 A 1.99867E-07 B -7.91049E-05 C 0.0688651 D 148.0028

Psi	Sin <sup>2</sup> (psi)	Pk Chan	Intens	FWHM	Kalp	Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00019	160.95	723.2	4.18	0.27322		161.60	0.780322	0.000057
5.0	0.00546	159.76	833.8	4.15	0.27217		161.53	0.780398	0.000059
10.0	0.02592	158.75	1005.0	4.06	0.27094		161.47	0.780462	0.000049
15.0	0.06037	160.15	873.2	4.02	0.27188		161.55	0.780372	0.000055
20.0	0.10770	162.40	935.7	3.80	0.27241		161.68	0.780227	0.000046
25.0	0.16719	163.21	1009.8	3.95	0.27385		161.73	0.780176	0.000054
30.0	0.23493	168.12	979.7	4.22	0.27978		162.01	0.779867	0.000050
35.0	0.31285	167.49	1251.3	3.72	0.27630		161.98	0.779904	0.000024
40.0	0.39403	171.91	909.9	4.15	0.28297		162.24	0.779630	0.000032
45.0	0.48051	171.86	574.0	3.97	0.28192		162.23	0.779632	0.000041

Fitted Delta D vs Sin<sup>2</sup>(psi) Data:

D Spacing Intercept.....: 0.780419  
 Slope of Fitted Line.....: -0.001789  
 Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -18.3 KSI -125.9 MPa

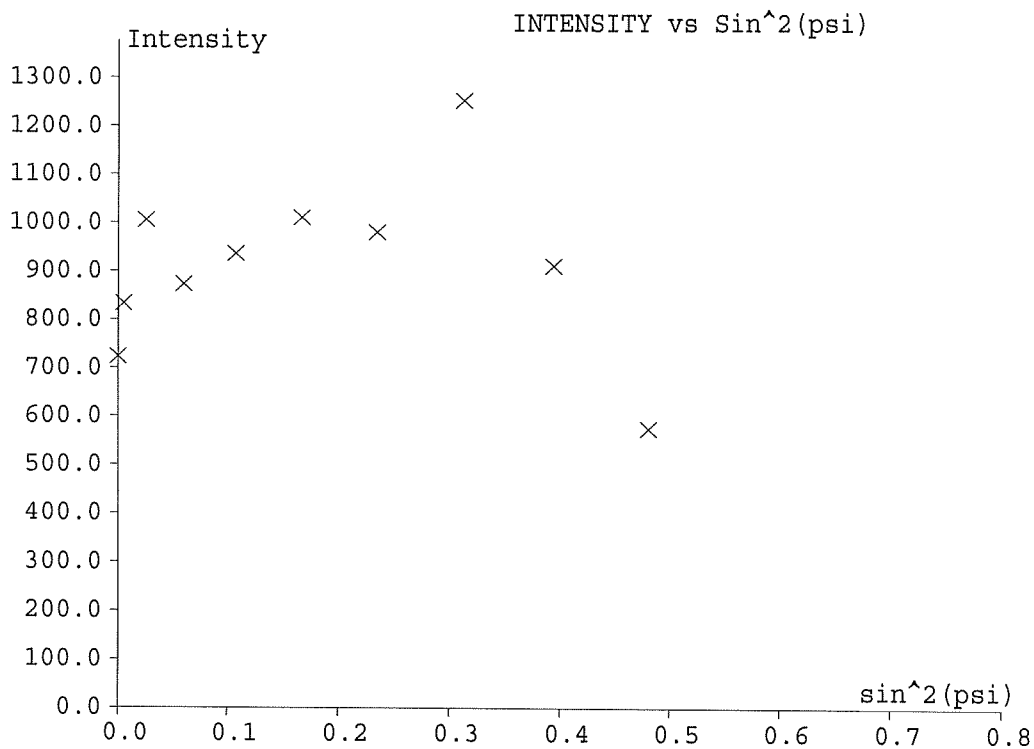
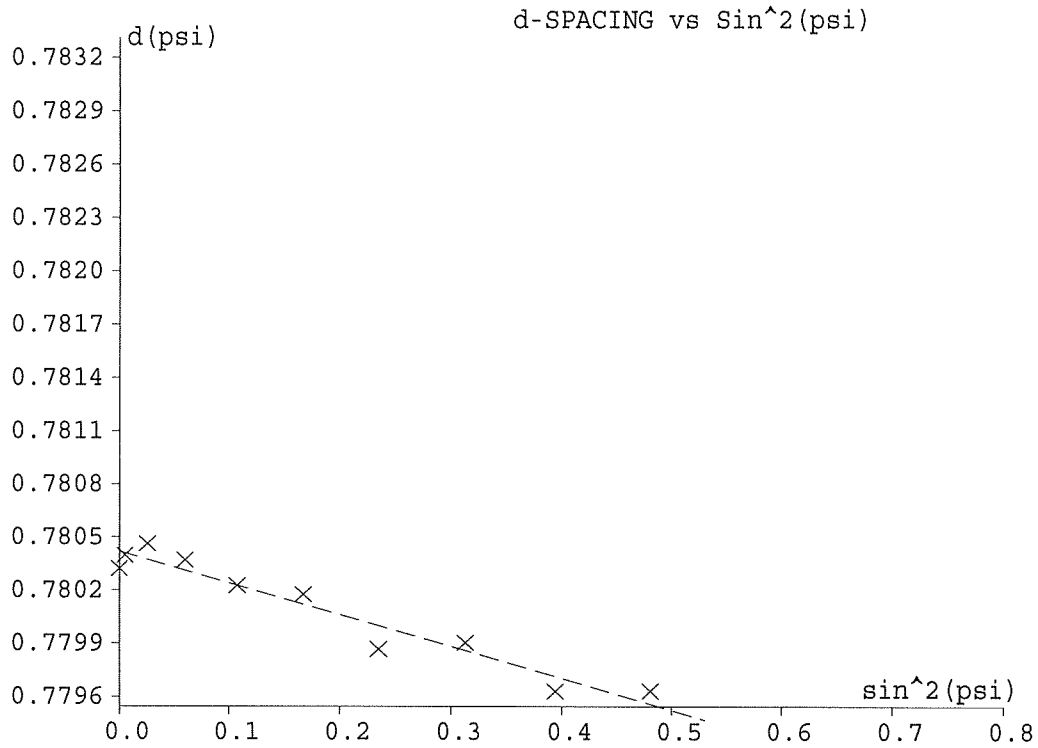
Counting Statistics Stress Error (+/-): 0.9 KSI 6.2 MPa  
 Probable error.....(+/-): 1.7 KSI 11.5 MPa  
 Warning: Counting statistics may be the controlling error!

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7773.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 3 / Baseline / Longitudinal  
ebm

*Residual Stress.....:	-18.3 KSI	-125.9 MPa
Counting Statistics Stress Error (+/-):	0.9 KSI	6.2 MPa
Probable error.....(+/-):	1.7 KSI	11.5 MPa



===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7774.STR  
Sample Description:  
SBIR / WP / CW Holes / AF Std 4 / Baseline / Longitudinal  
ebm

Acquisition date & time: 11/04/2005 5:43pm

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 20.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.00  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A 1.99867E-07 B -7.91049E-05 C 0.0688651 D 148.0028

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00017	159.41	746.1	3.95	0.27097	161.51	0.780419	0.000053
5.0	0.00566	157.04	706.5	3.91	0.26898	161.37	0.780572	0.000052
10.0	0.02591	158.82	1012.8	3.75	0.26931	161.48	0.780456	0.000047
15.0	0.05967	163.13	965.0	4.38	0.27624	161.72	0.780184	0.000065
20.0	0.10616	167.34	939.5	4.20	0.27898	161.97	0.779916	0.000041
25.0	0.16712	163.41	851.5	4.02	0.27442	161.74	0.780164	0.000045
30.0	0.23597	165.70	1038.6	3.99	0.27637	161.87	0.780018	0.000032
35.0	0.31289	167.41	1245.7	3.68	0.27598	161.98	0.779908	0.000025
40.0	0.39380	172.36	1099.2	4.05	0.28285	162.26	0.779601	0.000029
45.0	0.47775	177.29	601.0	4.31	0.28883	162.55	0.779299	0.000066

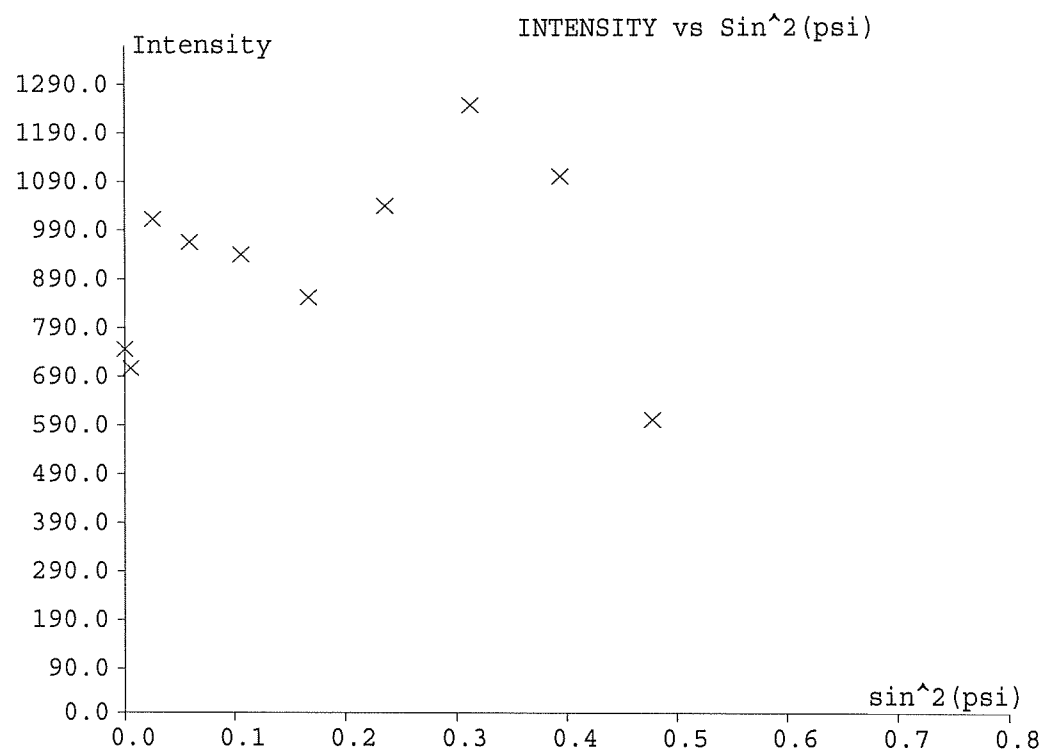
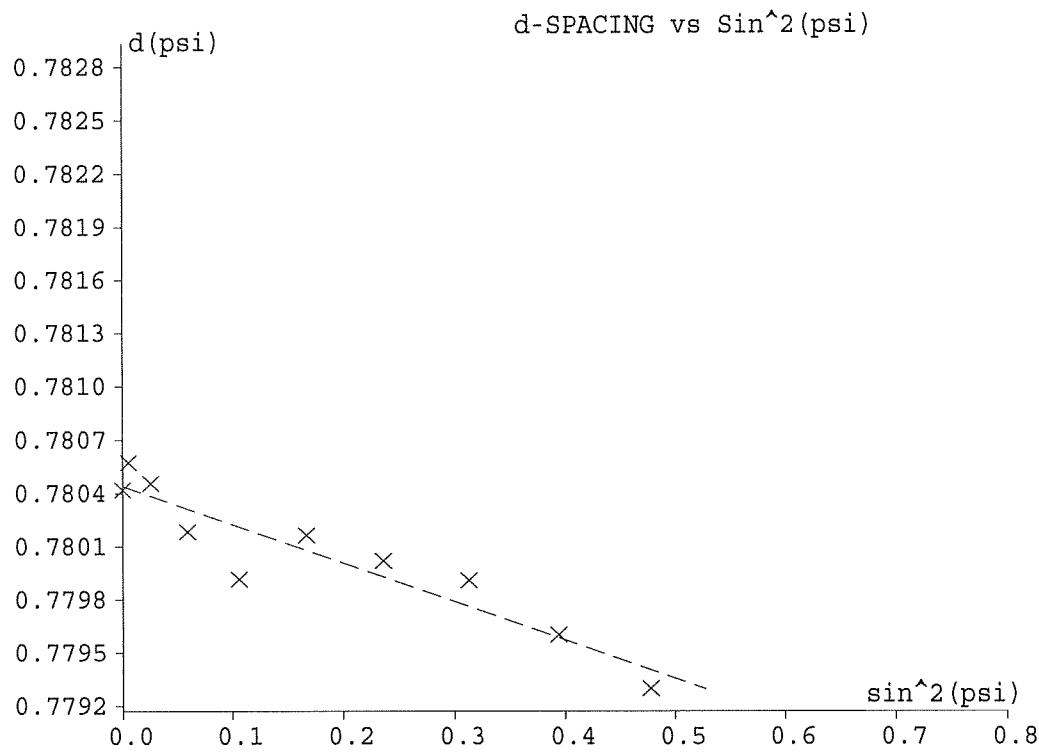
Fitted Delta D vs Sin^2(psi) Data:  
D Spacing Intercept.....: 0.780441  
Slope of Fitted Line.....: -0.00217  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -22.2 KSI -152.8 MPa

Counting Statistics Stress Error (+/-): 1.1 KSI 7.3 MPa  
Probable error.....(+/-): 3.0 KSI 20.5 MPa

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7774.STR  
Sample Description:  
SBIR / WP / CW Holes / AF Std 4 / Baseline / Longitudinal  
ebm

\*Residual Stress.....: -22.2 KSI -152.8 MPa  
Counting Statistics Stress Error (+/-): 1.1 KSI 7.3 MPa  
Probable error.....(+/-): 3.0 KSI 20.5 MPa





===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7775.STR  
Sample Description:  
SBIR / WP / CW Holes / AF Std 5 / Baseline / Longitudinal  
ebm

Acquisition date & time: 11/04/2005 5:48pm

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 20.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.00  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A 1.99867E-07 B -7.91049E-05 C 0.0688651 D 148.0028

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp	Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00026	165.04	745.2	4.25	0.27712		161.84	0.780061	0.000052
5.0	0.00522	162.89	800.6	3.60	0.27138		161.71	0.780194	0.000033
10.0	0.02511	163.75	806.6	3.50	0.27133		161.76	0.780138	0.000054
15.0	0.05960	163.36	1027.7	3.87	0.27363		161.74	0.780166	0.000036
20.0	0.10736	163.44	932.4	3.64	0.27210		161.75	0.780159	0.000031
25.0	0.16629	165.59	942.8	3.99	0.27626		161.87	0.780025	0.000039
30.0	0.23490	168.17	1145.3	3.86	0.27797		162.02	0.779862	0.000036
35.0	0.31384	165.40	1239.0	3.75	0.27468		161.86	0.780036	0.000032
40.0	0.39679	166.34	1061.2	3.87	0.27636		161.91	0.779977	0.000030
45.0	0.48175	169.42	721.8	3.85	0.27907		162.09	0.779784	0.000040

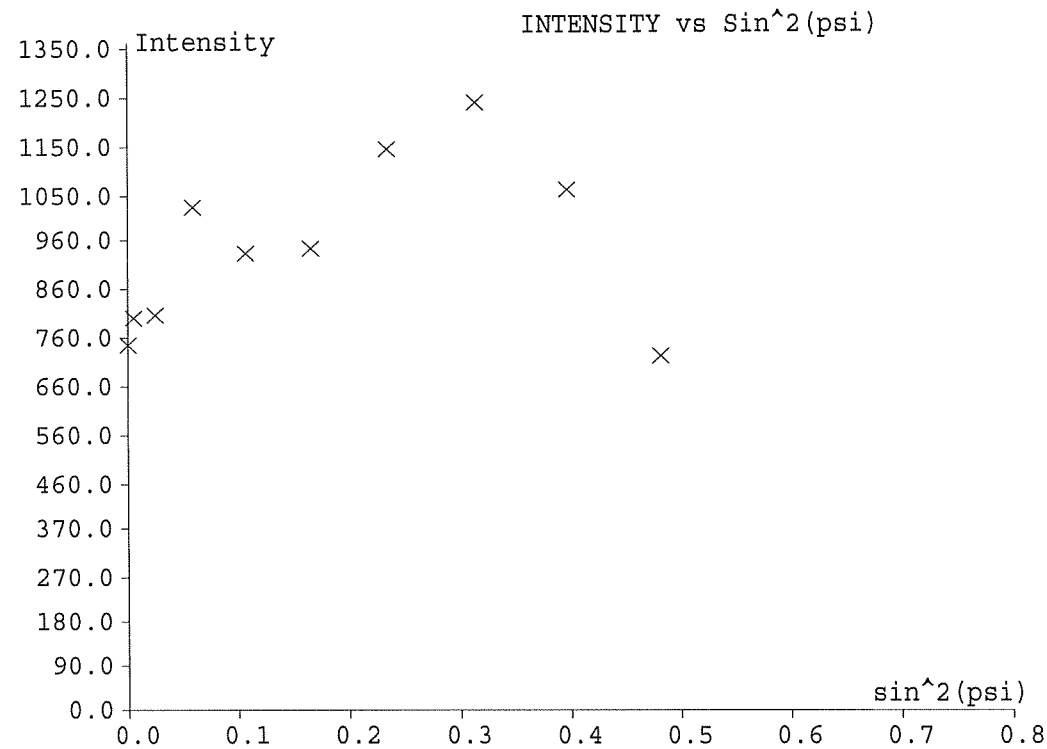
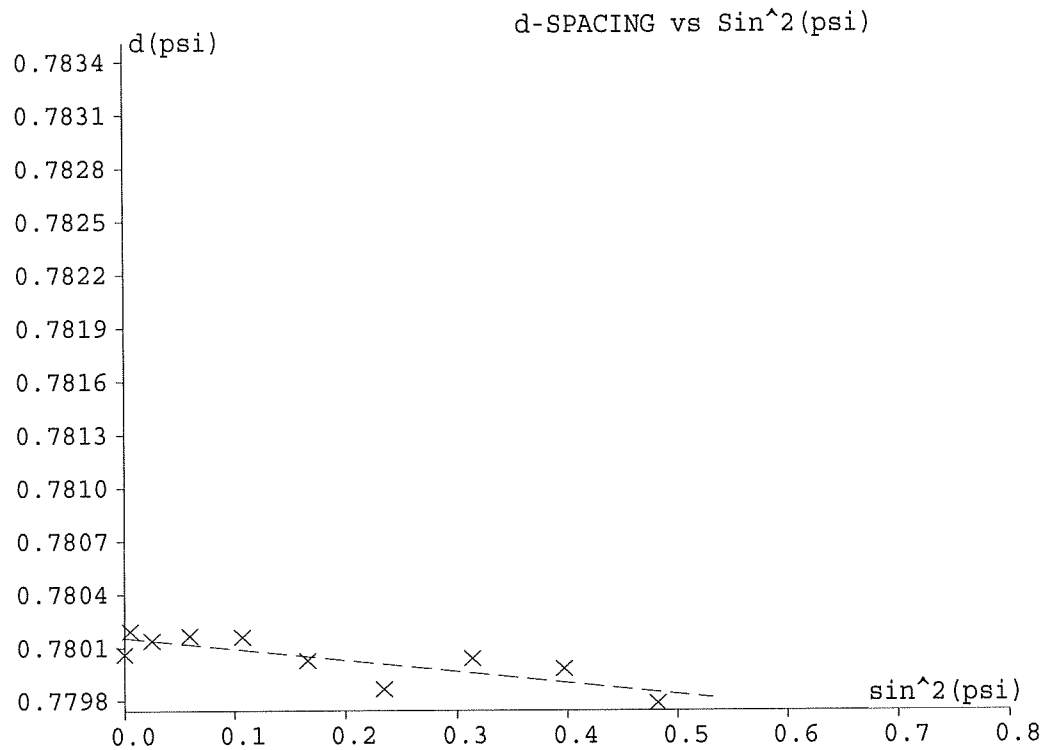
Fitted Delta D vs Sin^2(psi) Data:  
D Spacing Intercept.....: 0.780155  
Slope of Fitted Line.....: -0.0006423  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -6.6 KSI -45.2 MPa

Counting Statistics Stress Error (+/-): 0.8 KSI 5.5 MPa  
Probable error.....(+/-): 1.7 KSI 11.4 MPa

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7775.STR  
Sample Description:  
SBIR / WP / CW Holes / AF Std 5 / Baseline / Longitudinal  
ebm

*Residual Stress.....:	-6.6 KSI	-45.2 MPa
Counting Statistics Stress Error (+/-):	0.8 KSI	5.5 MPa
Probable error.....(+/-):	1.7 KSI	11.4 MPa



===== TEC Stress Analyzer v1.64 =====  
 ===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7776.STR  
 Sample Description:  
 SBIR / WP / CW Holes / AF Std 6 / Baseline / Longitudinal  
 ebm

Acquisition date & time: 11/04/2005 5:55pm

Material [hkl].....: Al 5083-H23 [333]  
 Depth.....: 0.0000000  
 Phi angle.....: 0.00  
 Collimator.....: Round\_4mm  
 Bracket.....: 160s  
 Peak Bounding Range [percent].....: 20  
 X-ray Target Description and Wavelength: copper 1.54056  
 PSI Oscillation Angle Range.....: 2.00  
 Spectra count time (PSI=0).....: 20.0  
 High Voltage(kV) and Beam Current(mA)...: 45.00 1.00  
 ADC Channels Full Scale.....: 256  
 Detector Calibration Coefficients:  
 A 1.99867E-07 B -7.91049E-05 C 0.0688651 D 148.0028

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp	Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00026	165.03	696.7	3.75	0.27436		161.84	0.780059	0.000086
5.0	0.00510	164.57	727.8	3.89	0.27481		161.81	0.780089	0.000048
10.0	0.02446	167.93	993.8	4.11	0.27905		162.00	0.779878	0.000039
15.0	0.05909	165.51	896.8	4.01	0.27628		161.86	0.780030	0.000038
20.0	0.10664	165.80	918.2	4.17	0.27738		161.88	0.780013	0.000045
25.0	0.16590	166.61	747.1	4.00	0.27725		161.93	0.779961	0.000057
30.0	0.23627	164.92	1099.0	3.35	0.27076		161.83	0.780062	0.000037
35.0	0.31348	166.17	1239.2	3.79	0.27565		161.90	0.779987	0.000028
40.0	0.39648	166.96	965.2	3.81	0.27656		161.95	0.779938	0.000031
45.0	0.48270	167.51	807.9	3.54	0.27491		161.98	0.779901	0.000033

Fitted Delta D vs Sin^2(psi) Data:

D Spacing Intercept.....: 0.780027  
 Slope of Fitted Line.....: -0.0001988  
 Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -2.0 KSI -14.0 MPa

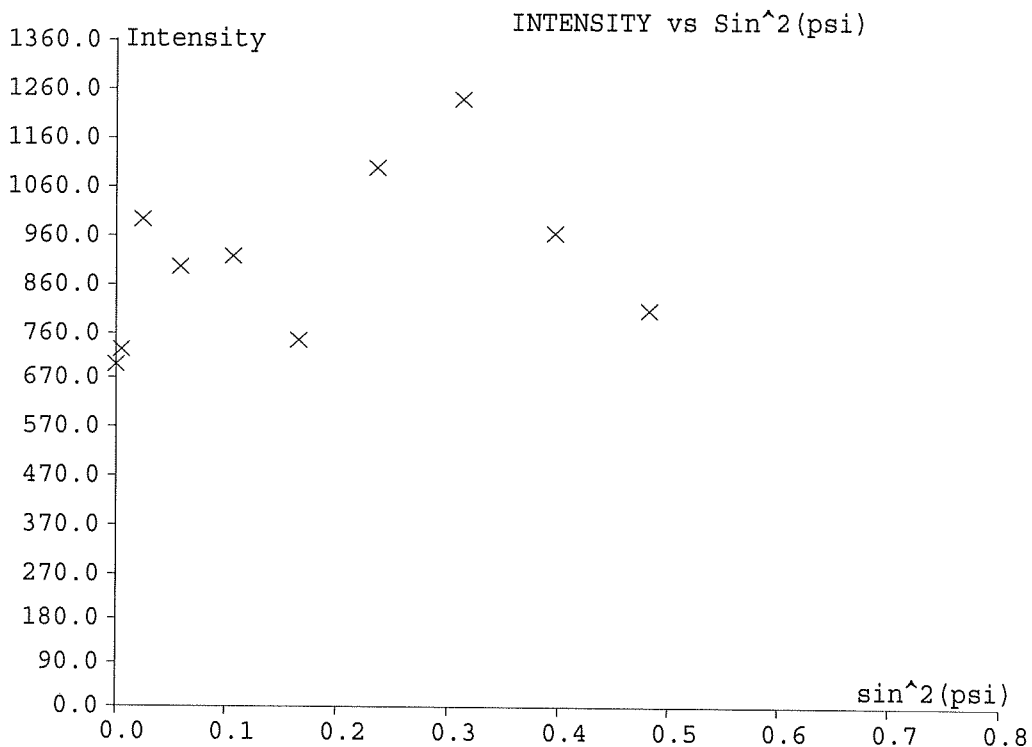
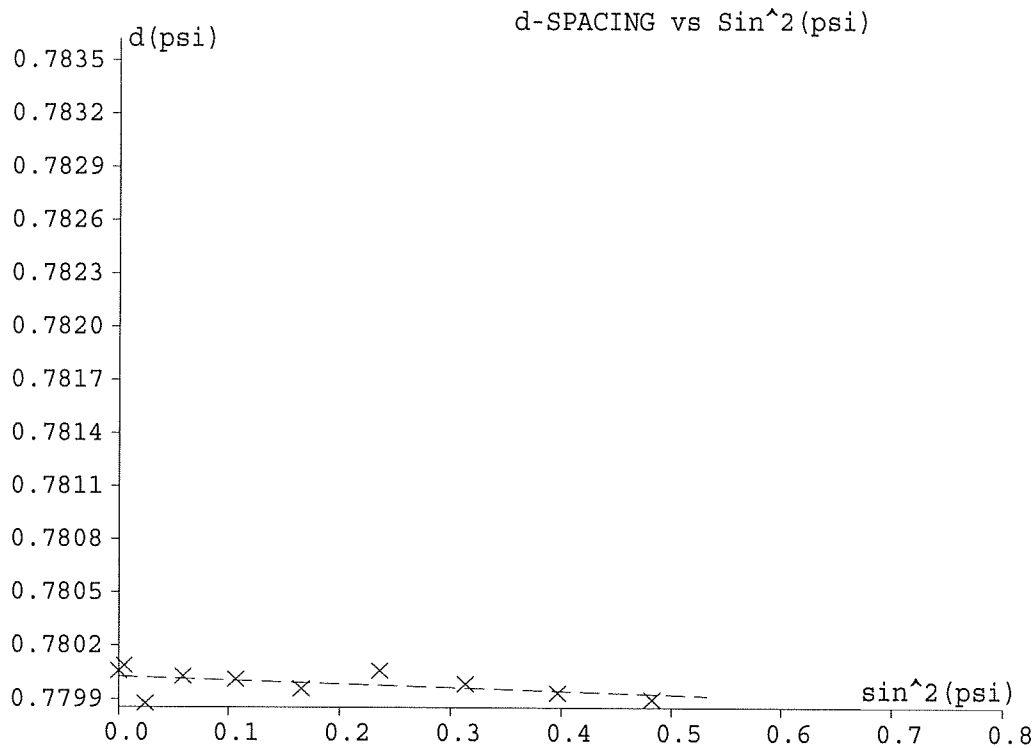
Counting Statistics Stress Error (+/-): 0.9 KSI 6.2 MPa  
 Probable error.....(+/-): 1.3 KSI 9.1 MPa  
 Warning: Counting statistics may be the controlling error!

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7776.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 6 / Baseline / Longitudinal  
ebm

*Residual Stress.....:	-2.0 KSI	-14.0 MPa
Counting Statistics Stress Error (+/-):	0.9 KSI	6.2 MPa
Probable error.....(+/-):	1.3 KSI	9.1 MPa



===== TEC Stress Analyzer v1.64 =====  
 ===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7777.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 7 / Baseline / Longitudinal  
 ebm

Acquisition date & time: 11/04/2005 6:01pm

Material [hkl].....: Al 5083-H23 [333]  
 Depth.....: 0.0000000  
 Phi angle.....: 0.00  
 Collimator.....: Round\_4mm  
 Bracket.....: 160s  
 Peak Bounding Range [percent].....: 20  
 X-ray Target Description and Wavelength: copper 1.54056  
 PSI Oscillation Angle Range.....: 2.00  
 Spectra count time (PSI=0).....: 20.0  
 High Voltage(kV) and Beam Current(mA)...: 45.00 1.00  
 ADC Channels Full Scale.....: 256  
 Detector Calibration Coefficients:  
 A 1.99867E-07 B -7.91049E-05 C 0.0688651 D 148.0028

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp	Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00018	159.58	731.0	4.04	0.27149		161.52	0.780409	0.000086
5.0	0.00559	158.02	837.1	4.12	0.27065		161.43	0.780510	0.000044
10.0	0.02590	158.92	865.0	4.27	0.27219		161.48	0.780453	0.000072
15.0	0.06017	161.05	865.9	4.55	0.27575		161.60	0.780318	0.000061
20.0	0.10833	160.45	821.0	4.33	0.27381		161.57	0.780354	0.000039
25.0	0.16685	164.08	1093.9	3.72	0.27323		161.78	0.780119	0.000034
30.0	0.23603	165.57	1044.0	4.13	0.27696		161.87	0.780027	0.000053
35.0	0.31306	167.08	1225.2	3.88	0.27708		161.96	0.779931	0.000031
40.0	0.39382	172.32	966.1	3.92	0.28209		162.26	0.779603	0.000025
45.0	0.48011	172.66	572.1	4.22	0.28404		162.28	0.779584	0.000040

Fitted Delta D vs Sin^2(psi) Data:

D Spacing Intercept.....: 0.780481  
 Slope of Fitted Line.....: -0.001954  
 Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -19.9 KSI -137.5 MPa

Counting Statistics Stress Error (+/-): 1.0 KSI 7.0 MPa

Probable error.....(+/-): 1.3 KSI 9.1 MPa

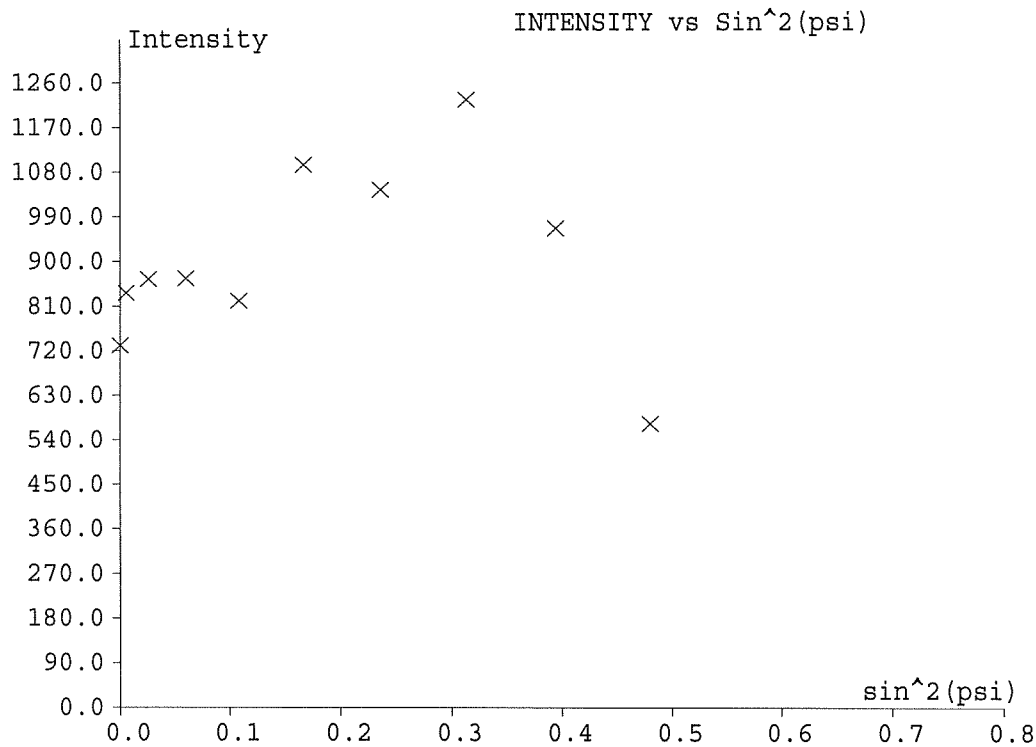
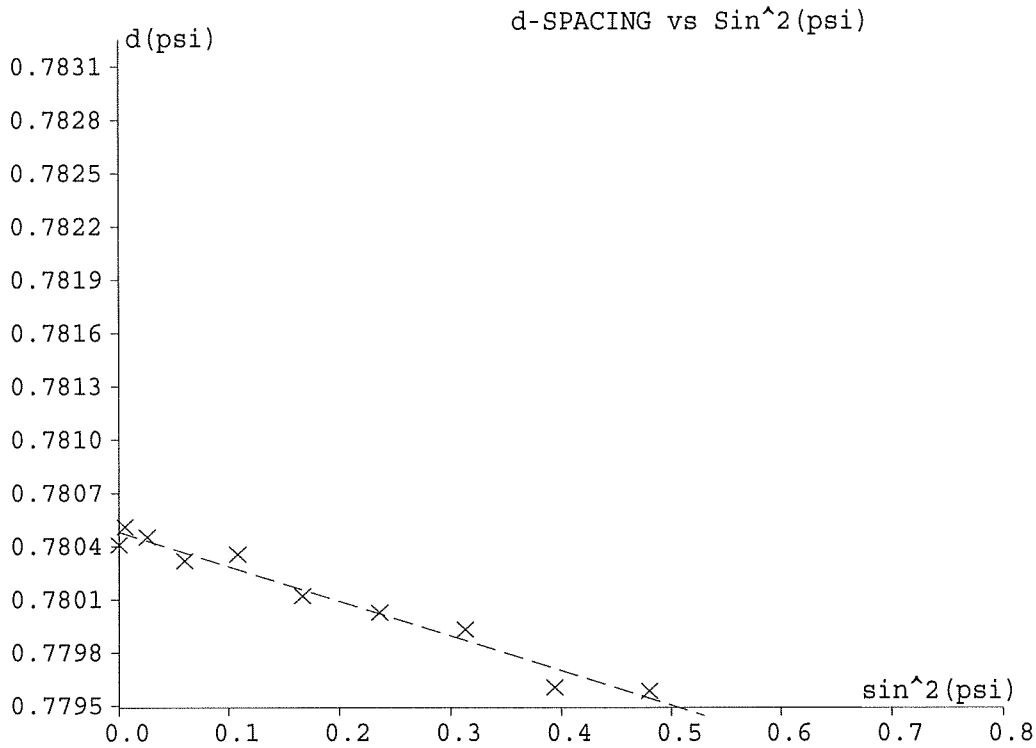
Warning: Counting statistics may be the controlling error!

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7777.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 7 / Baseline / Longitudinal  
ebm

*Residual Stress.....:	-19.9 KSI	-137.5 MPa
Counting Statistics Stress Error (+/-):	1.0 KSI	7.0 MPa
Probable error.....(+/-):	1.3 KSI	9.1 MPa



===== TEC Stress Analyzer v1.64 =====  
 ===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7778.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 8 / Baseline / Longitudinal  
 ebm

Acquisition date & time: 11/04/2005 6:06pm

Material [hkl].....: Al 5083-H23 [333]  
 Depth.....: 0.0000000  
 Phi angle.....: 0.00  
 Collimator.....: Round\_4mm  
 Bracket.....: 160s  
 Peak Bounding Range [percent].....: 20  
 X-ray Target Description and Wavelength: copper 1.54056  
 PSI Oscillation Angle Range.....: 2.00  
 Spectra count time (PSI=0).....: 20.0  
 High Voltage(kV) and Beam Current(mA)...: 45.00 1.00  
 ADC Channels Full Scale.....: 256  
 Detector Calibration Coefficients:  
 A 1.99867E-07 B -7.91049E-05 C 0.0688651 D 148.0028

Psi	Sin <sup>2</sup> (psi)	Pk Chan	Intens	FWHM	Kalp Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00016	158.48	710.0	4.16	0.27121	161.45	0.780480	0.000065
5.0	0.00553	158.77	918.9	4.03	0.27086	161.47	0.780461	0.000051
10.0	0.02568	160.28	864.6	4.09	0.27228	161.56	0.780364	0.000046
15.0	0.06010	161.30	1003.0	4.21	0.27369	161.62	0.780299	0.000049
20.0	0.10695	164.81	895.4	4.17	0.27640	161.82	0.780075	0.000058
25.0	0.16682	164.18	862.2	3.96	0.27482	161.79	0.780114	0.000049
30.0	0.23534	167.17	1151.4	4.02	0.27786	161.96	0.779926	0.000051
35.0	0.31327	166.60	1047.7	3.77	0.27591	161.93	0.779960	0.000032
40.0	0.39467	170.62	808.3	4.13	0.28166	162.16	0.779710	0.000040
45.0	0.48028	172.31	563.8	3.87	0.28182	162.26	0.779604	0.000048

Fitted Delta D vs Sin<sup>2</sup>(psi) Data:

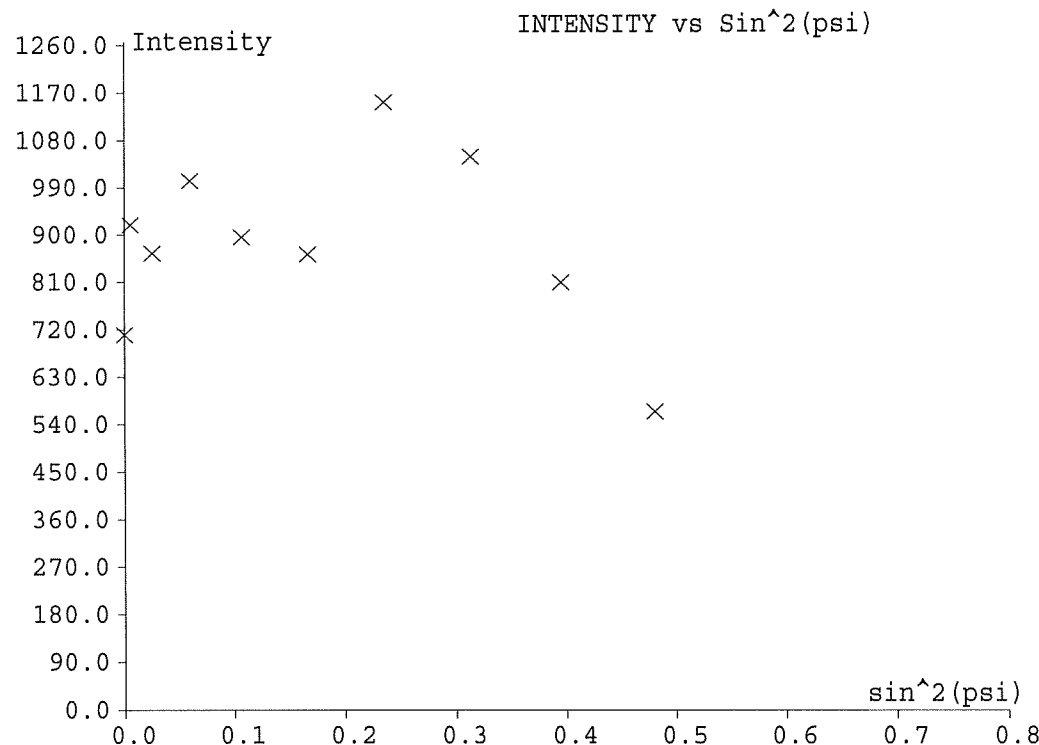
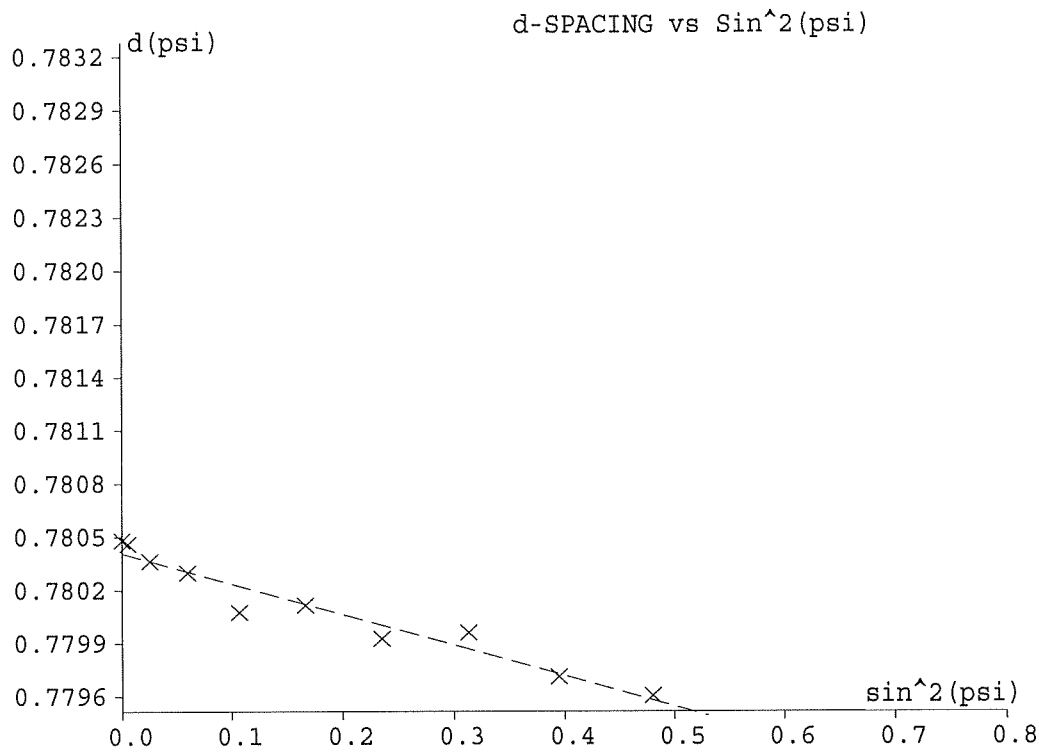
D Spacing Intercept.....: 0.780409  
 Slope of Fitted Line.....: -0.001728  
 Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -17.6 KSI -121.7 MPa

Counting Statistics Stress Error (+/-): 1.0 KSI 6.7 MPa  
 Probable error.....(+/-): 1.5 KSI 10.4 MPa  
 Warning: Counting statistics may be the controlling error!

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7778.STR  
Sample Description:  
SBIR / WP / CW Holes / AF Std 8 / Baseline / Longitudinal  
ebm

\*Residual Stress.....: -17.6 KSI -121.7 MPa  
Counting Statistics Stress Error (+/-): 1.0 KSI 6.7 MPa  
Probable error.....(+/-): 1.5 KSI 10.4 MPa





===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7779.STR  
Sample Description:  
SBIR / WP / CW Holes / AF Std 9 / Baseline / Longitudinal  
ebm

Acquisition date & time: 11/04/2005 6:12pm

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 20.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.00  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A 1.99867E-07 B -7.91049E-05 C 0.0688651 D 148.0028

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp	Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00031	168.36	649.9	4.44	0.28138		162.03	0.779853	0.000069
5.0	0.00521	163.11	811.1	4.00	0.27403		161.72	0.780182	0.000046
10.0	0.02479	165.80	973.5	4.01	0.27653		161.88	0.780012	0.000045
15.0	0.05880	166.72	892.8	4.18	0.27825		161.93	0.779955	0.000040
20.0	0.10680	165.25	891.0	3.81	0.27499		161.85	0.780045	0.000040
25.0	0.16608	166.11	960.9	3.59	0.27413		161.90	0.779989	0.000037
30.0	0.23465	168.75	1128.8	3.80	0.27807		162.05	0.779825	0.000040
35.0	0.31302	167.17	1156.2	4.12	0.27839		161.96	0.779926	0.000032
40.0	0.39673	166.47	796.3	3.87	0.27649		161.92	0.779969	0.000036
45.0	0.48091	171.06	760.5	3.78	0.28000		162.19	0.779681	0.000041

Fitted Delta D vs Sin^2(psi) Data:

D Spacing Intercept.....: 0.780030  
Slope of Fitted Line.....: -0.0004821  
Material Stress Constant.....: 1.255E-07

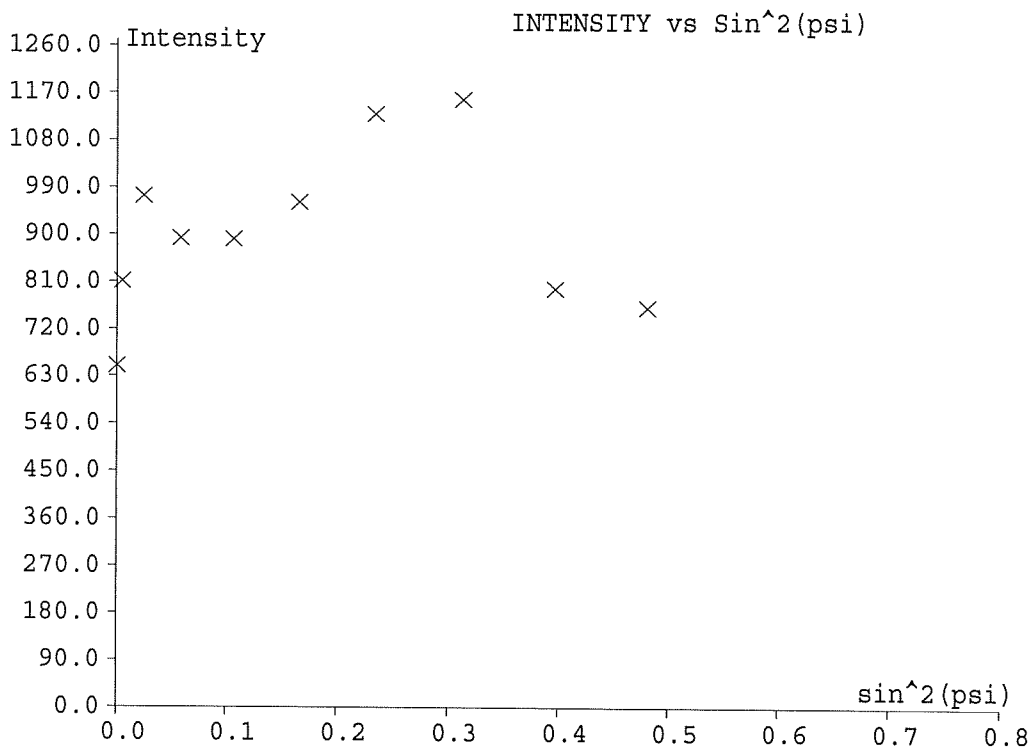
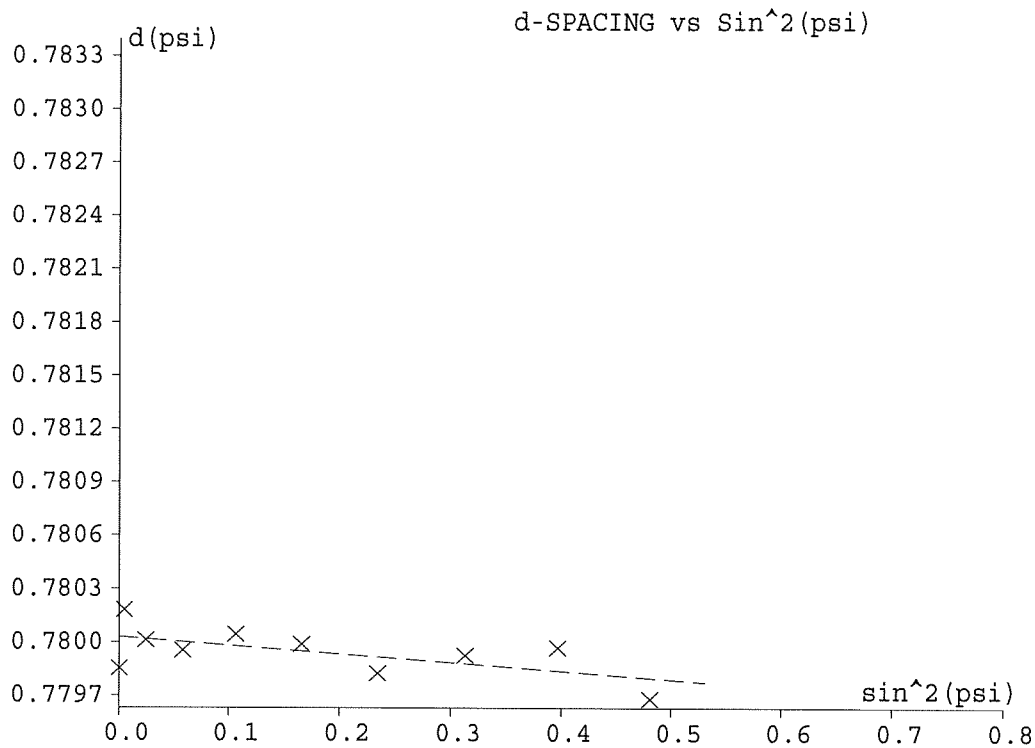
\*Residual Stress.....: -4.9 KSI -34.0 MPa

Counting Statistics Stress Error (+/-): 0.9 KSI 6.1 MPa  
Probable error.....(+/-): 2.3 KSI 15.6 MPa

Sample Description:

SBIR / WP / CW Holes / AF Std 9 / Baseline / Longitudinal  
ebm

*Residual Stress.....:	-4.9 KSI	-34.0 MPa
Counting Statistics Stress Error (+/-):	0.9 KSI	6.1 MPa
Probable error.....(+/-):	2.3 KSI	15.6 MPa



===== TEC Stress Analyzer v1.64 =====  
 ===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7780.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 10 / Baseline / Longitudinal  
 ebm

Acquisition date & time: 11/04/2005 6:18pm

Material [hkl].....: Al 5083-H23 [333]  
 Depth.....: 0.0000000  
 Phi angle.....: 0.00  
 Collimator.....: Round\_4mm  
 Bracket.....: 160s  
 Peak Bounding Range [percent].....: 20  
 X-ray Target Description and Wavelength: copper 1.54056  
 PSI Oscillation Angle Range.....: 2.00  
 Spectra count time (PSI=0).....: 20.0  
 High Voltage(kV) and Beam Current(mA)...: 45.00 1.00  
 ADC Channels Full Scale.....: 256  
 Detector Calibration Coefficients:  
 A 1.99867E-07 B -7.91049E-05 C 0.0688651 D 148.0028

Psi	Sin <sup>2</sup> (psi)	Pk Chan	Intens	FWHM	Kalp Cor	A	2-Theta	D Spacing	St. Dev.
0.0	0.00018	159.53	771.0	3.92	0.27094		161.52	0.780412	0.000043
5.0	0.00543	160.06	833.5	4.08	0.27208		161.55	0.780378	0.000064
10.0	0.02578	159.64	844.7	4.49	0.27427		161.52	0.780408	0.000104
15.0	0.05907	165.58	830.5	4.23	0.27752		161.87	0.780027	0.000053
20.0	0.10813	161.07	782.7	4.05	0.27268		161.60	0.780313	0.000043
25.0	0.16759	162.12	991.7	3.62	0.27092		161.67	0.780243	0.000036
30.0	0.23625	165.01	1239.4	3.61	0.27330		161.84	0.780059	0.000031
35.0	0.31200	169.32	1220.1	3.81	0.27869		162.09	0.779790	0.000035
40.0	0.39482	170.32	968.8	4.10	0.28120		162.14	0.779728	0.000045
45.0	0.47952	173.77	617.2	3.72	0.28198		162.35	0.779512	0.000037

Fitted Delta D vs Sin<sup>2</sup>(psi) Data:

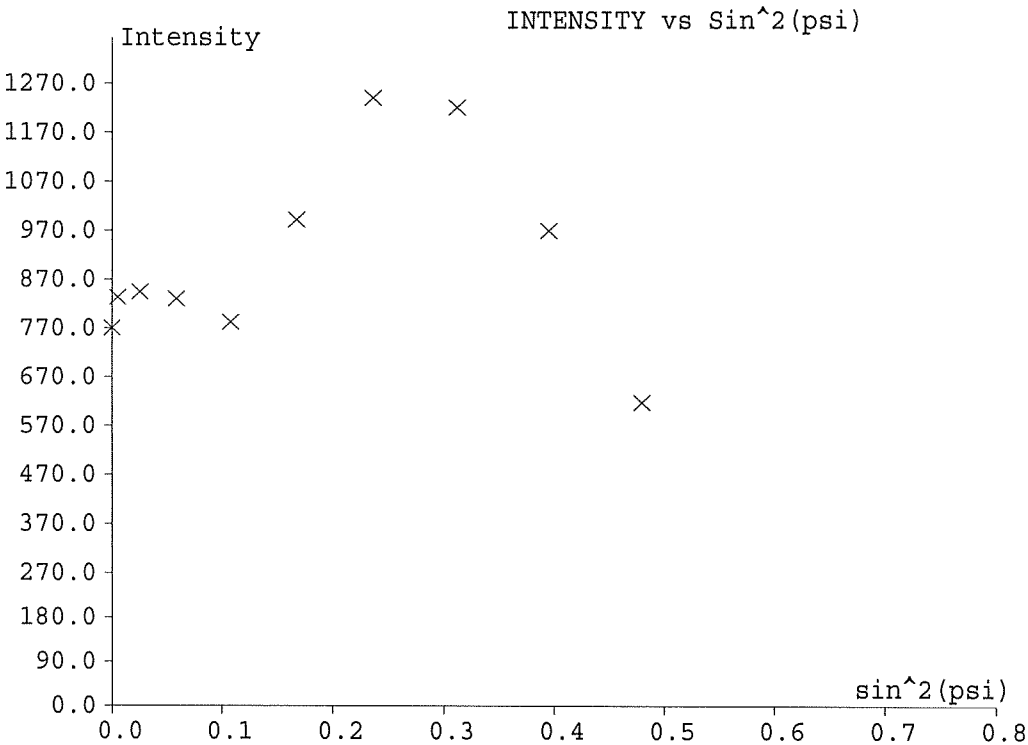
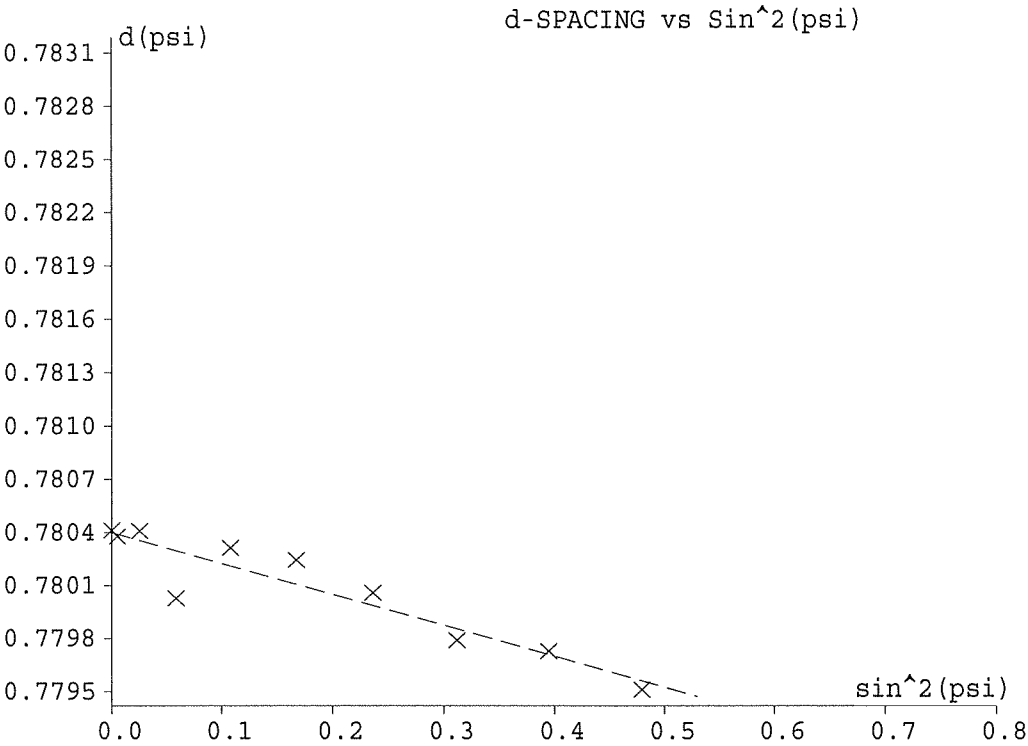
D Spacing Intercept.....: 0.780400  
 Slope of Fitted Line.....: -0.001748  
 Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -17.8 KSI -123.1 MPa

Counting Statistics Stress Error (+/-): 1.0 KSI 7.2 MPa  
 Probable error.....(+/-): 2.4 KSI 16.6 MPa

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7780.STR  
Sample Description:  
SBIR / WP / CW Holes / AF Std 10 / Baseline / Longitudinal  
ebm

\*Residual Stress.....: -17.8 KSI -123.1 MPa  
Counting Statistics Stress Error (+/-): 1.0 KSI 7.2 MPa  
Probable error.....(+/-): 2.4 KSI 16.6 MPa



===== TEC Stress Analyzer v1.64 =====  
 ===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7781.STR  
 Sample Description:  
 SBIR / WP / CW Holes / AF Std 11 / Baseline / Longitudinal  
 ebm

Acquisition date & time: 11/04/2005 6:23pm

Material [hkl].....: Al 5083-H23 [333]  
 Depth.....: 0.0000000  
 Phi angle.....: 0.00  
 Collimator.....: Round\_4mm  
 Bracket.....: 160s  
 Peak Bounding Range [percent].....: 20  
 X-ray Target Description and Wavelength: copper 1.54056  
 PSI Oscillation Angle Range.....: 2.00  
 Spectra count time (PSI=0).....: 20.0  
 High Voltage(kV) and Beam Current(mA)...: 45.00 1.00  
 ADC Channels Full Scale.....: 256  
 Detector Calibration Coefficients:  
 A 1.99867E-07 B -7.91049E-05 C 0.0688651 D 148.0028

Psi	Sin <sup>2</sup> (psi)	Pk Chan	Intens	FWHM	Kalp Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00027	165.84	792.6	4.07	0.27688	161.88	0.780010	0.000055
5.0	0.00496	166.55	778.8	3.95	0.27695	161.92	0.779964	0.000040
10.0	0.02488	165.24	1004.8	3.75	0.27452	161.85	0.780046	0.000040
15.0	0.05892	166.21	897.6	4.27	0.27831	161.90	0.779988	0.000057
20.0	0.10628	166.94	1050.2	4.00	0.27754	161.95	0.779940	0.000043
25.0	0.16671	164.47	819.6	3.84	0.27449	161.80	0.780095	0.000036
30.0	0.23553	166.67	871.5	3.53	0.27410	161.93	0.779954	0.000035
35.0	0.31328	166.61	1349.2	3.94	0.27695	161.93	0.779960	0.000023
40.0	0.39505	169.86	798.8	4.11	0.28083	162.12	0.779758	0.000027
45.0	0.48237	168.16	669.3	3.67	0.27649	162.02	0.779861	0.000029

Fitted Delta D vs Sin<sup>2</sup>(psi) Data:

D Spacing Intercept.....: 0.780025  
 Slope of Fitted Line.....: -0.0003778  
 Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -3.9 KSI -26.6 MPa

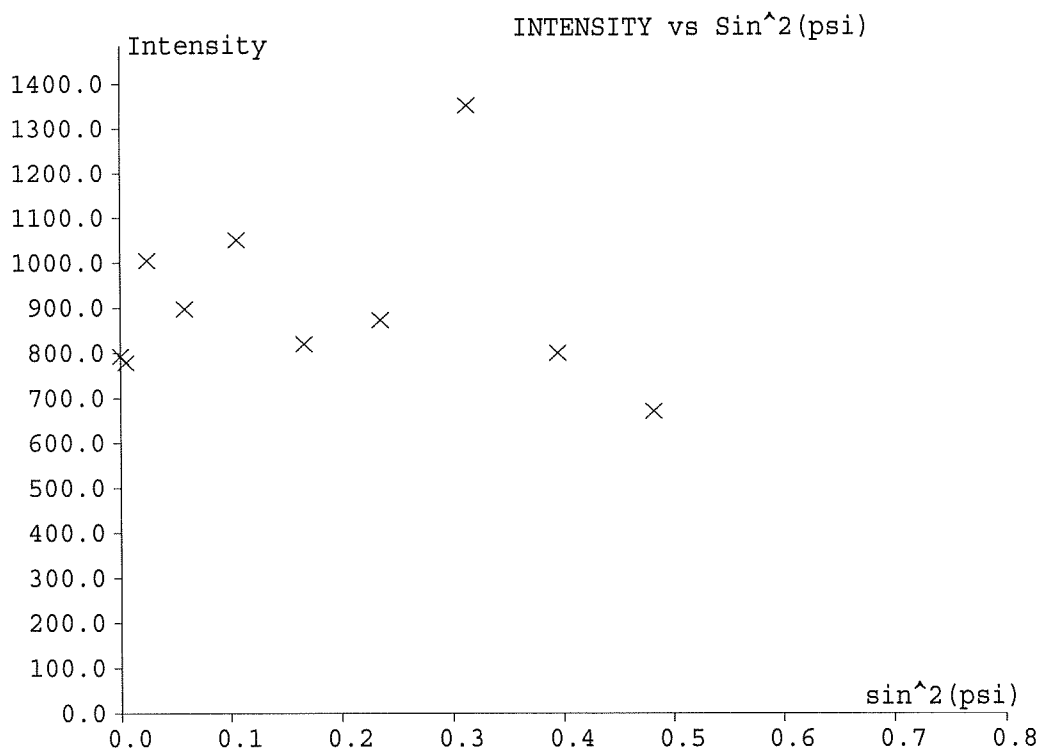
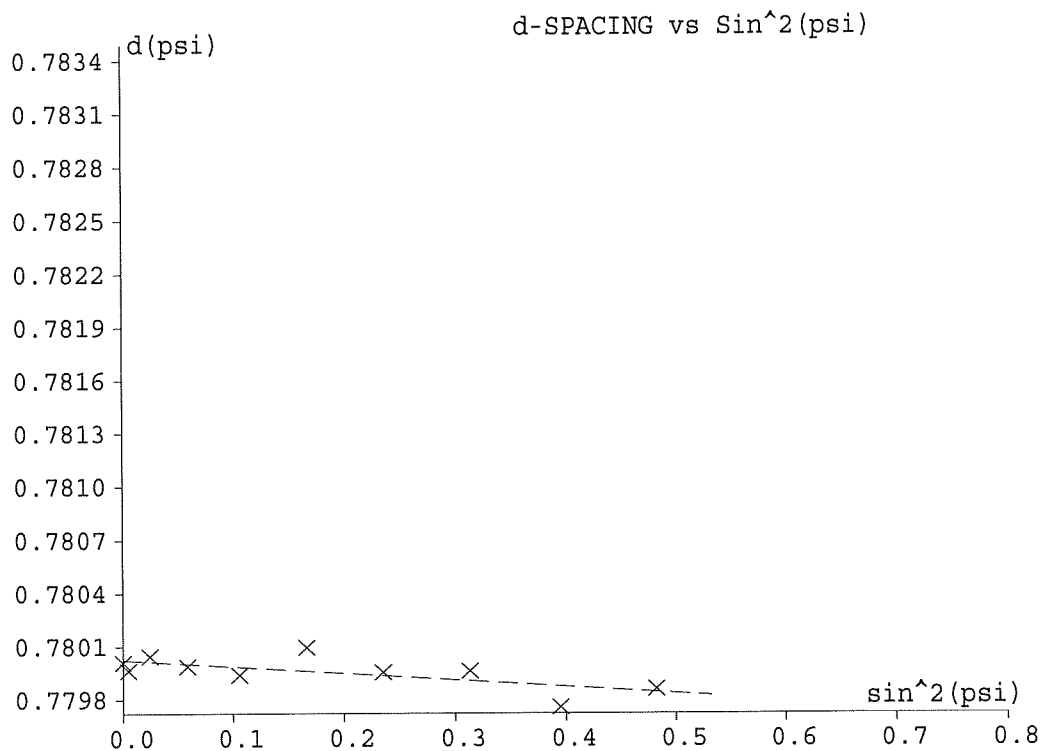
Counting Statistics Stress Error (+/-): 0.7 KSI 5.1 MPa  
 Probable error.....(+/-): 1.4 KSI 9.9 MPa  
 Warning: Counting statistics may be the controlling error!

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7781.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 11 / Baseline / Longitudinal  
ebm

*Residual Stress.....:	-3.9 KSI	-26.6 MPa
Counting Statistics Stress Error (+/-):	0.7 KSI	5.1 MPa
Probable error.....(+/-):	1.4 KSI	9.9 MPa



===== TEC Stress Analyzer v1.64 =====  
 ===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7782.STR  
 Sample Description:  
 SBIR / WP / CW Holes / AF Std 12 / Baseline / Longitudinal  
 ebm

Acquisition date & time: 11/04/2005 6:29pm

Material [hkl].....: Al 5083-H23 [333]  
 Depth.....: 0.0000000  
 Phi angle.....: 0.00  
 Collimator.....: Round\_4mm  
 Bracket.....: 160s  
 Peak Bounding Range [percent].....: 20  
 X-ray Target Description and Wavelength: copper 1.54056  
 PSI Oscillation Angle Range.....: 2.00  
 Spectra count time (PSI=0).....: 20.0  
 High Voltage(kV) and Beam Current(mA)...: 45.00 1.00  
 ADC Channels Full Scale.....: 256  
 Detector Calibration Coefficients:  
 A 1.99867E-07 B -7.91049E-05 C 0.0688651 D 148.0028

Psi	Sin <sup>2</sup> (psi)	Pk Chan	Intens	FWHM	Kalp Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00018	159.82	812.5	4.26	0.27283	161.53	0.780394	0.000049
5.0	0.00559	157.92	835.2	4.15	0.27075	161.42	0.780516	0.000055
10.0	0.02584	159.20	962.4	3.73	0.26947	161.50	0.780432	0.000043
15.0	0.06011	161.28	942.6	4.07	0.27294	161.62	0.780300	0.000045
20.0	0.10732	163.65	858.9	4.38	0.27669	161.75	0.780150	0.000059
25.0	0.16710	163.45	973.4	3.91	0.27392	161.74	0.780160	0.000045
30.0	0.23644	164.54	1145.7	3.48	0.27179	161.81	0.780088	0.000029
35.0	0.31341	166.34	1195.2	3.95	0.27675	161.91	0.779977	0.000032
40.0	0.39497	170.01	729.8	4.01	0.28043	162.13	0.779747	0.000038
45.0	0.48032	172.22	800.2	3.84	0.28152	162.26	0.779609	0.000033

Fitted Delta D vs Sin<sup>2</sup>(psi) Data:

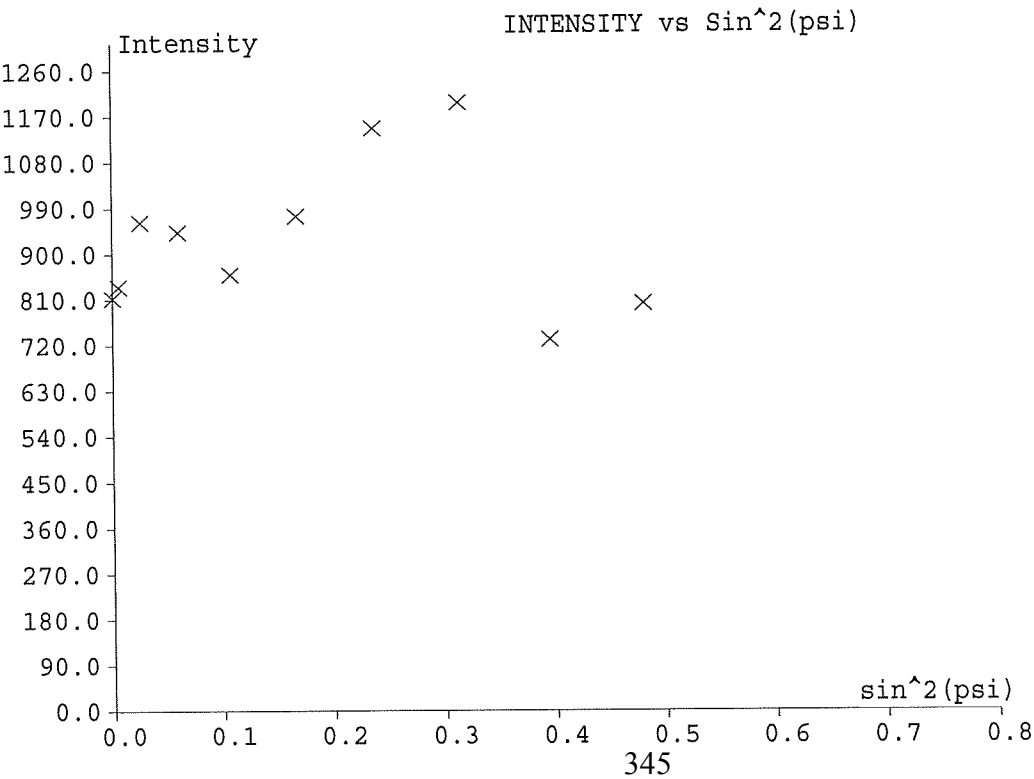
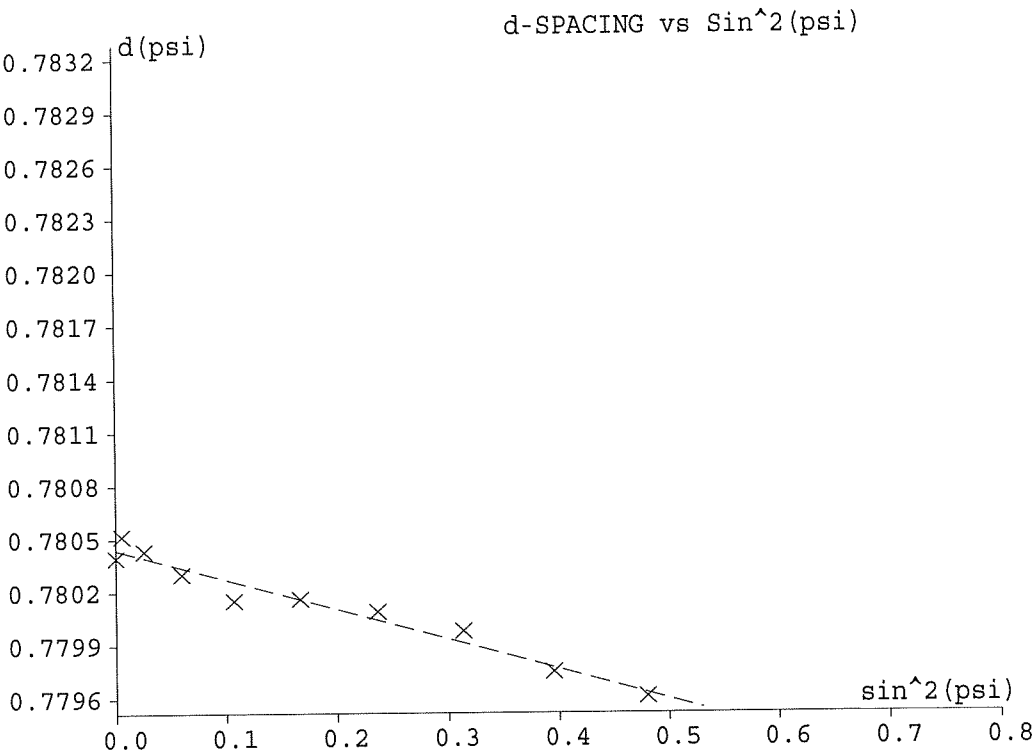
D Spacing Intercept.....: 0.780440  
 Slope of Fitted Line.....: -0.001688  
 Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -17.2 KSI -118.8 MPa

Counting Statistics Stress Error (+/-): 0.8 KSI 5.6 MPa  
 Probable error.....(+/-): 1.3 KSI 8.6 MPa  
 Warning: Counting statistics may be the controlling error!

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7782.STR  
Sample Description:  
SBIR / WP / CW Holes / AF Std 12 / Baseline / Longitudinal  
ebm

\*Residual Stress.....: -17.2 KSI -118.8 MPa  
Counting Statistics Stress Error (+/-): 0.8 KSI 5.6 MPa  
Probable error.....(+/-): 1.3 KSI 8.6 MPa





===== TEC Stress Analyzer v1.64 =====  
 ===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7783.STR  
 Sample Description:  
 SBIR / WP / CW Holes / AF Std 13 / Baseline / Longitudinal  
 ebm

Acquisition date & time: 11/04/2005 6:34pm

Material [hkl].....: Al 5083-H23 [333]  
 Depth.....: 0.0000000  
 Phi angle.....: 0.00  
 Collimator.....: Round\_4mm  
 Bracket.....: 160s  
 Peak Bounding Range [percent].....: 20  
 X-ray Target Description and Wavelength: copper 1.54056  
 PSI Oscillation Angle Range.....: 2.00  
 Spectra count time (PSI=0).....: 20.0  
 High Voltage(kV) and Beam Current(mA)...: 45.00 1.00  
 ADC Channels Full Scale.....: 256  
 Detector Calibration Coefficients:  
 A 1.99867E-07 B -7.91049E-05 C 0.0688651 D 148.0028

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00025	164.66	842.7	4.15	0.27619	161.81	0.780085	0.000045
5.0	0.00484	168.17	824.6	3.94	0.27839	162.02	0.779863	0.000043
10.0	0.02468	166.49	879.5	3.94	0.27685	161.92	0.779968	0.000055
15.0	0.05870	167.11	846.5	4.00	0.27769	161.96	0.779929	0.000052
20.0	0.10666	165.71	762.8	3.94	0.27610	161.88	0.780017	0.000039
25.0	0.16594	166.53	829.0	4.02	0.27725	161.92	0.779966	0.000053
30.0	0.23489	168.17	1187.4	3.71	0.27687	162.02	0.779861	0.000028
35.0	0.31341	166.18	1395.9	3.07	0.26805	161.91	0.779979	0.000028
40.0	0.39585	168.25	794.2	4.15	0.27951	162.02	0.779858	0.000047
45.0	0.48222	168.46	683.1	3.67	0.27680	162.04	0.779842	0.000034

Fitted Delta D vs Sin^2(psi) Data:

D Spacing Intercept.....: 0.779982  
 Slope of Fitted Line.....: -0.0002556  
 Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -2.6 KSI -18.0 MPa

Counting Statistics Stress Error (+/-): 0.8 KSI 5.7 MPa  
 Probable error.....(+/-): 1.4 KSI 9.8 MPa  
 Warning: Counting statistics may be the controlling error!

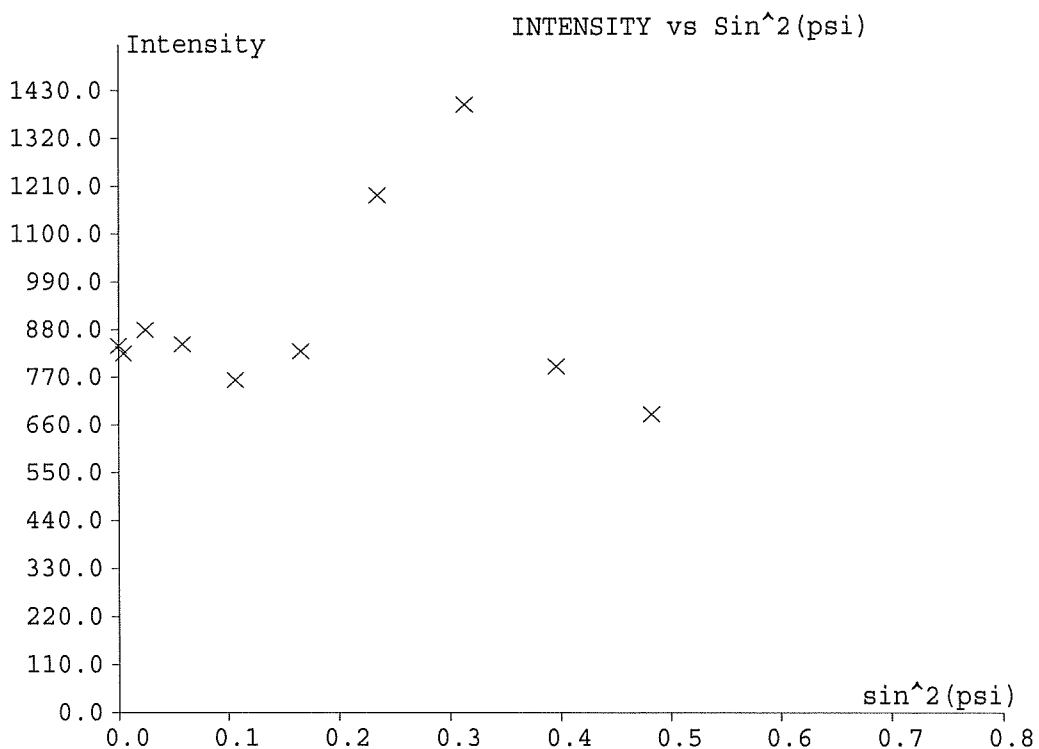
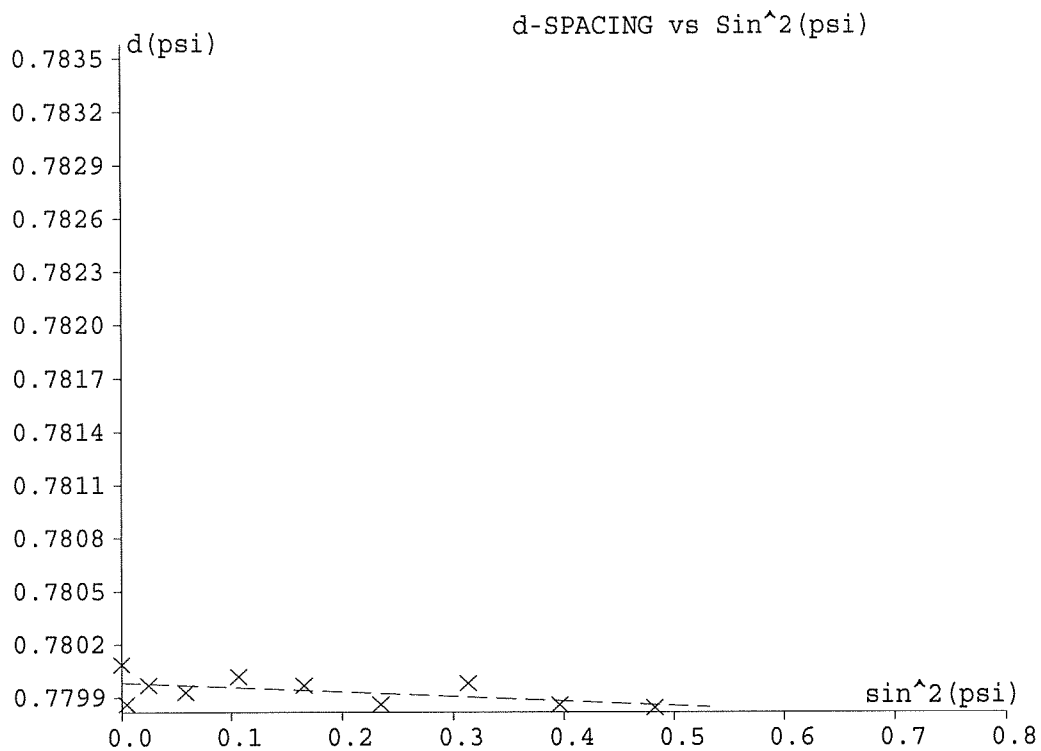
File: C:\STRESS\DATA\2143\2005\SBIR\50632\7783.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 13 / Baseline / Longitudinal

ebm

*Residual Stress.....:	-2.6 KSI	-18.0 MPa
Counting Statistics Stress Error (+/-):	0.8 KSI	5.7 MPa
Probable error.....(+/-):	1.4 KSI	9.8 MPa



===== TEC Stress Analyzer v1.64 =====  
 ===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7784.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 14 / Baseline / Longitudinal  
 ebm

Acquisition date & time: 11/04/2005 6:40pm

Material [hkl].....: Al 5083-H23 [333]  
 Depth.....: 0.0000000  
 Phi angle.....: 0.00  
 Collimator.....: Round\_4mm  
 Bracket.....: 160s  
 Peak Bounding Range [percent].....: 20  
 X-ray Target Description and Wavelength: copper 1.54056  
 PSI Oscillation Angle Range.....: 2.00  
 Spectra count time (PSI=0).....: 20.0  
 High Voltage(kV) and Beam Current(mA)...: 45.00 1.00  
 ADC Channels Full Scale.....: 256  
 Detector Calibration Coefficients:  
 A 1.99867E-07 B -7.91049E-05 C 0.0688651 D 148.0028

Psi	Sin <sup>2</sup> (psi)	Pk Chan	Intens	FWHM	Kalp Cor	A	2-Theta	D Spacing	St. Dev.
0.0	0.00020	161.25	706.0	3.98	0.27252		161.62	0.780301	0.000052
5.0	0.00560	157.77	850.6	3.79	0.26889		161.41	0.780524	0.000046
10.0	0.02575	159.84	878.8	4.07	0.27185		161.53	0.780392	0.000046
15.0	0.05986	162.31	950.6	4.17	0.27423		161.68	0.780234	0.000037
20.0	0.10841	160.15	937.9	4.00	0.27175		161.55	0.780372	0.000040
25.0	0.16724	163.04	962.9	3.72	0.27232		161.72	0.780185	0.000037
30.0	0.23662	164.17	1170.6	3.74	0.27351		161.79	0.780114	0.000035
35.0	0.31199	169.33	1250.2	3.81	0.27867		162.09	0.779789	0.000039
40.0	0.39458	170.75	1113.9	3.74	0.27941		162.17	0.779699	0.000032
45.0	0.47980	173.22	652.7	3.73	0.28153		162.32	0.779546	0.000035

Fitted Delta D vs Sin<sup>2</sup>(psi) Data:

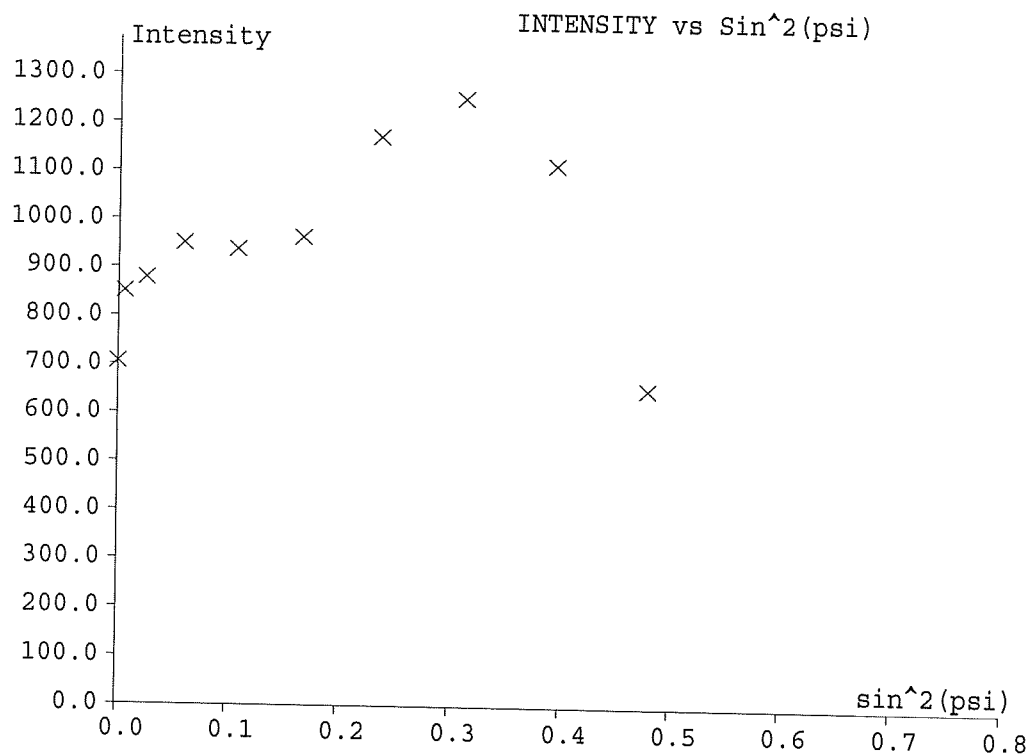
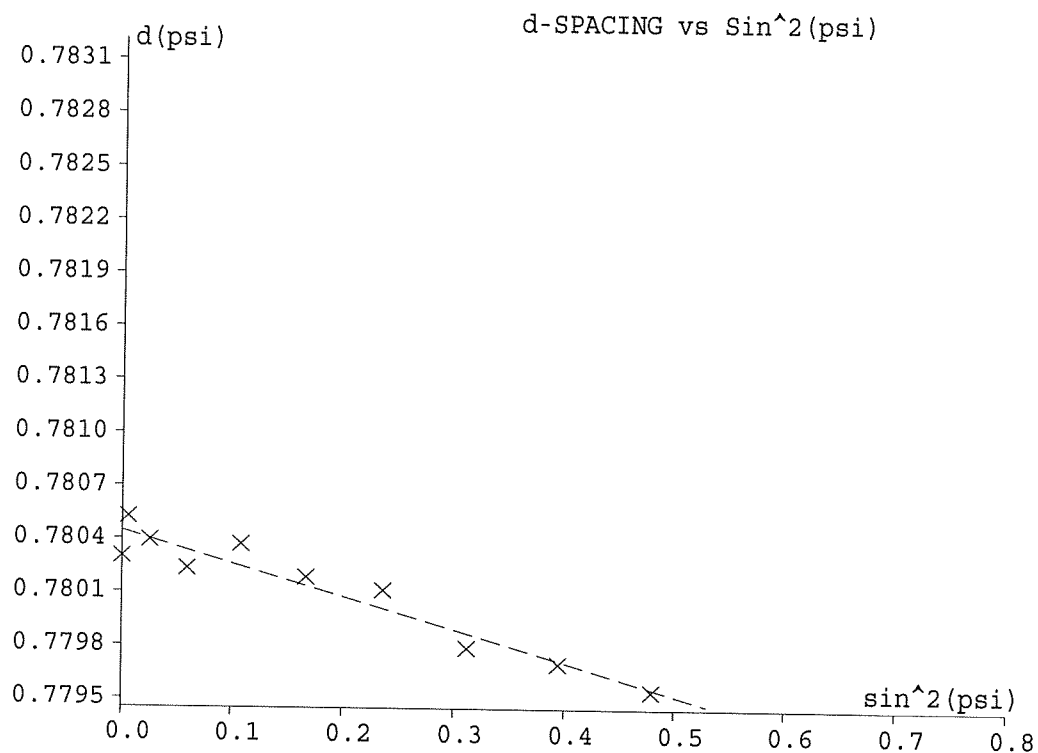
D Spacing Intercept.....: 0.780446  
 Slope of Fitted Line.....: -0.001843  
 Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -18.8 KSI -129.7 MPa

Counting Statistics Stress Error (+/-): 0.8 KSI 5.5 MPa  
 Probable error.....(+/-): 1.9 KSI 13.3 MPa

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7784.STR  
Sample Description:  
SBIR / WP / CW Holes / AF Std 14 / Baseline / Longitudinal  
ebm

\*Residual Stress.....: -18.8 KSI -129.7 MPa  
Counting Statistics Stress Error (+/-): 0.8 KSI 5.5 MPa  
Probable error.....(+/-): 1.9 KSI 13.3 MPa



===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7785.STR  
Sample Description:  
SBIR / WP / CW Holes / AF Std 15 / Baseline / Longitudinal  
ebm

Acquisition date & time: 11/04/2005 6:45pm

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 20.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.00  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A 1.99867E-07 B -7.91049E-05 C 0.0688651 D 148.0028

Psi	Sin <sup>2</sup> (psi)	Pk Chan	Intens	FWHM	Kalp Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00018	160.07	860.7	3.96	0.27152	161.55	0.780377	0.000045
5.0	0.00560	157.87	813.8	4.19	0.27085	161.42	0.780520	0.000046
10.0	0.02582	159.39	1029.2	3.99	0.27111	161.51	0.780421	0.000039
15.0	0.06014	161.15	974.8	4.07	0.27284	161.61	0.780308	0.000043
20.0	0.10654	166.13	732.8	4.22	0.27793	161.90	0.779992	0.000048
25.0	0.16650	165.03	866.7	3.98	0.27570	161.84	0.780060	0.000042
30.0	0.23613	165.29	1124.2	3.69	0.27415	161.85	0.780042	0.000034
35.0	0.31260	168.04	976.2	3.93	0.27819	162.01	0.779870	0.000029
40.0	0.39454	170.89	827.9	4.12	0.28185	162.18	0.779693	0.000040
45.0	0.48073	171.40	727.5	3.70	0.27966	162.21	0.779659	0.000029

Fitted Delta D vs Sin<sup>2</sup>(psi) Data:

D Spacing Intercept.....: 0.780395  
Slope of Fitted Line.....: -0.001679  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -17.1 KSI -118.2 MPa

Counting Statistics Stress Error (+/-): 0.7 KSI 5.1 MPa  
Probable error.....(+/-): 2.0 KSI 14.1 MPa

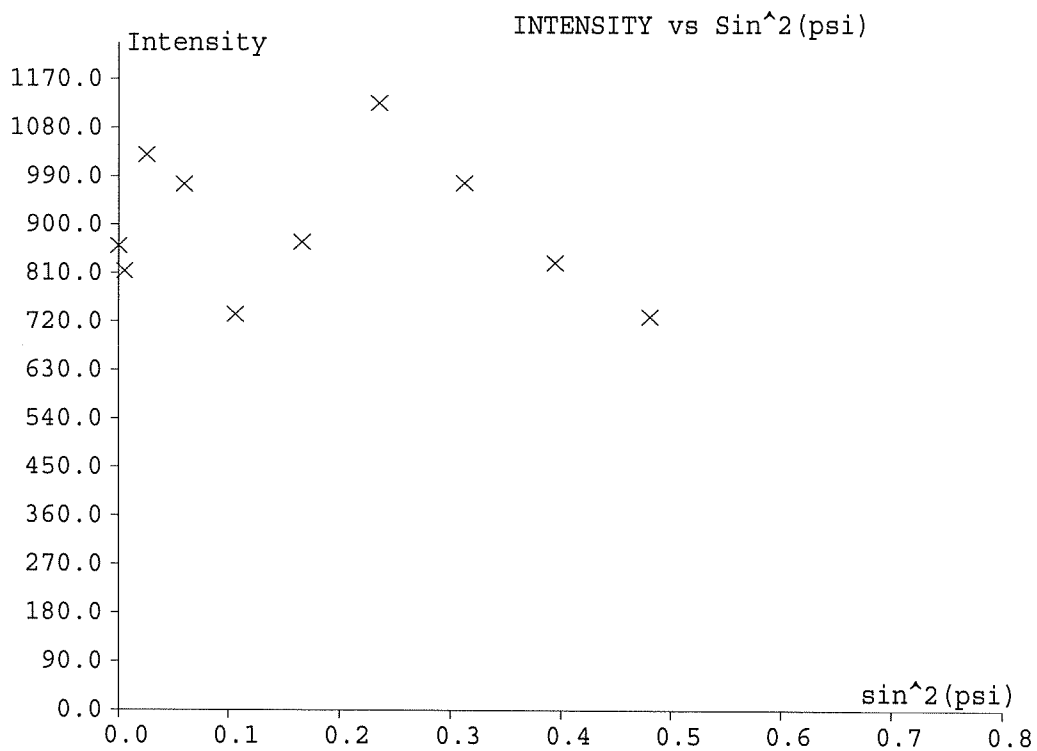
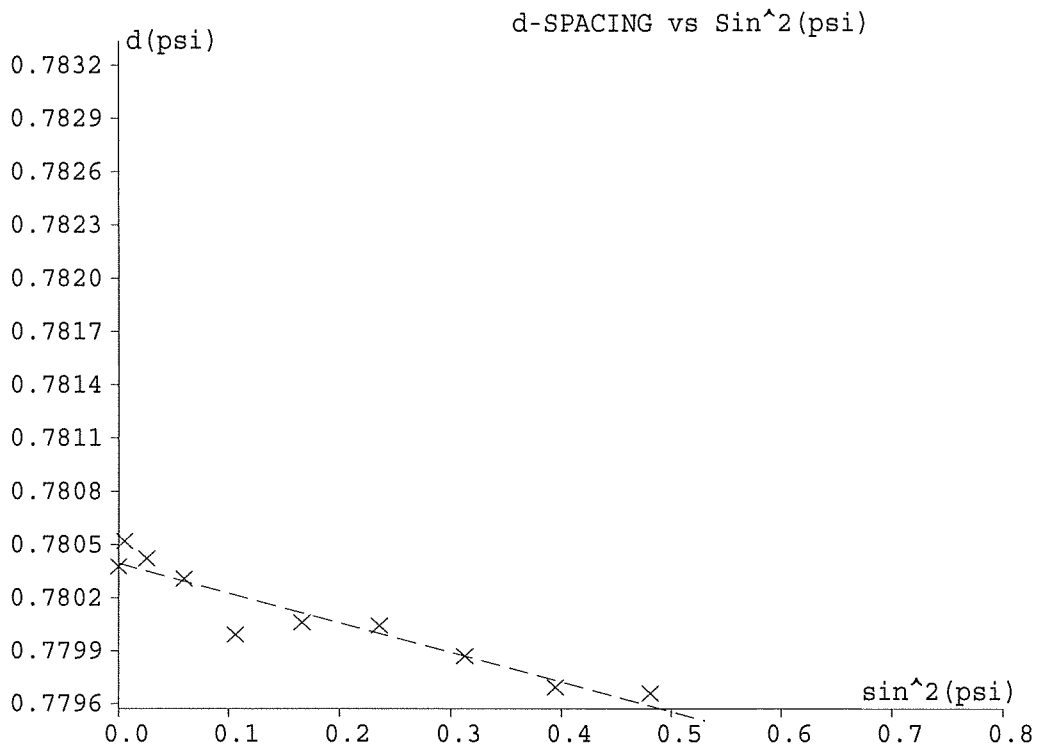
File: C:\STRESS\DATA\2143\2005\SBIR\50632\7785.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 15 / Baseline / Longitudinal

ebm

*Residual Stress.....:	-17.1 KSI	-118.2 MPa
Counting Statistics Stress Error (+/-):	0.7 KSI	5.1 MPa
Probable error.....(+/-):	2.0 KSI	14.1 MPa



===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7786.STR  
Sample Description:  
SBIR / WP / CW Holes / AF Std 16 / Baseline / Longitudinal  
ebm

Acquisition date & time: 11/04/2005 6:51pm

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 20.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.00  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A 1.99867E-07 B -7.91049E-05 C 0.0688651 D 148.0028

Psi	Sin <sup>2</sup> (psi)	Pk Chan	Intens	FWHM	Kalp Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00017	159.01	635.9	3.94	0.27061	161.49	0.780445	0.000052
5.0	0.00550	159.12	753.9	3.89	0.27045	161.49	0.780438	0.000049
10.0	0.02596	158.47	940.7	3.90	0.26999	161.45	0.780480	0.000054
15.0	0.05985	162.34	972.3	4.13	0.27408	161.68	0.780232	0.000042
20.0	0.10814	161.00	857.1	3.98	0.27234	161.60	0.780317	0.000040
25.0	0.16653	164.95	931.9	3.94	0.27545	161.83	0.780065	0.000045
30.0	0.23599	165.65	1145.7	4.00	0.27639	161.87	0.780021	0.000039
35.0	0.31198	169.37	1093.9	4.14	0.28052	162.09	0.779788	0.000036
40.0	0.39515	169.65	997.8	3.91	0.27958	162.11	0.779770	0.000050
45.0	0.47989	173.11	585.9	4.32	0.28499	162.31	0.779556	0.000190

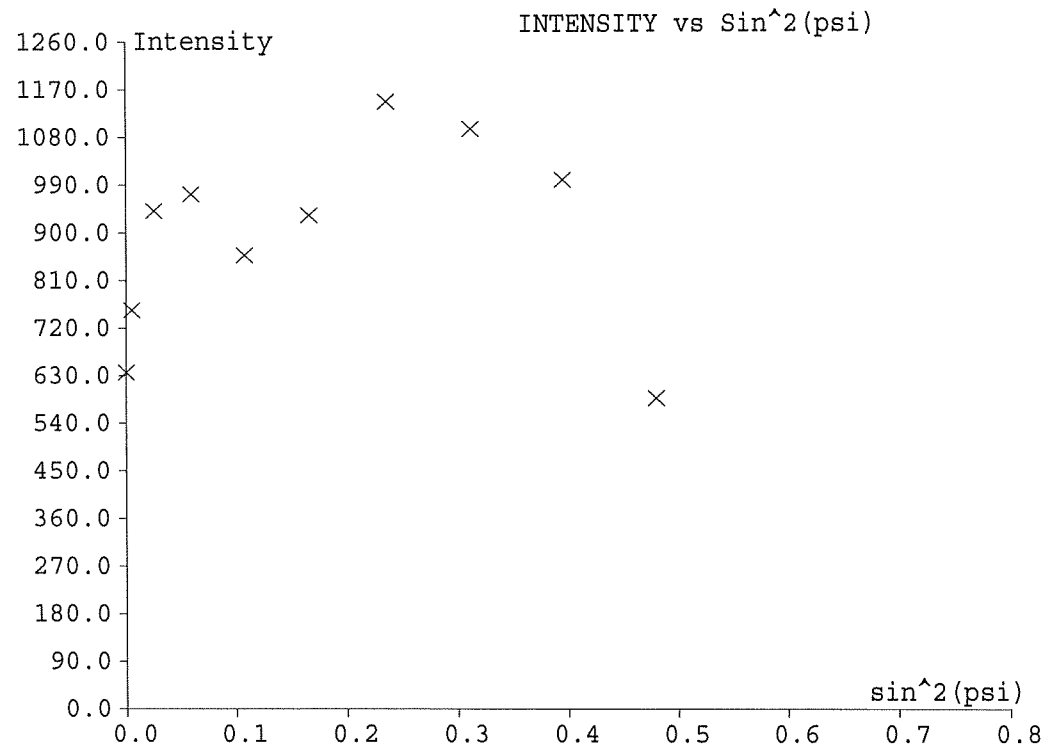
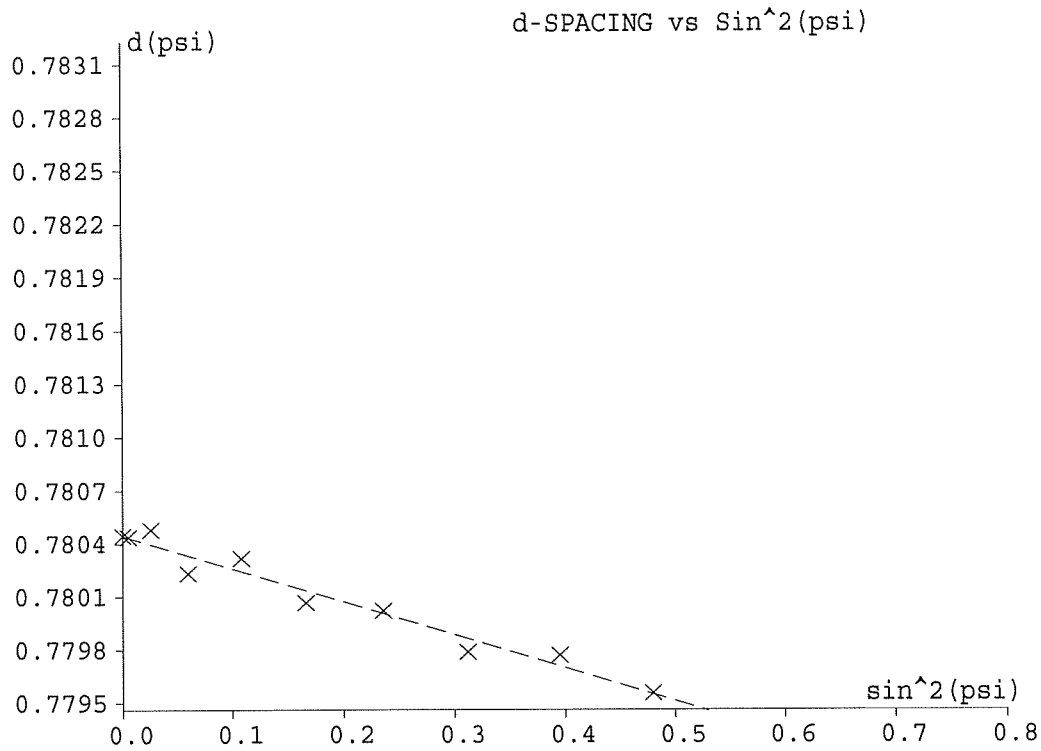
Fitted Delta D vs Sin<sup>2</sup>(psi) Data:  
D Spacing Intercept.....: 0.780445  
Slope of Fitted Line.....: -0.001864  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -19.0 KSI -131.2 MPa

Counting Statistics Stress Error (+/-): 2.4 KSI 16.2 MPa  
Probable error.....(+/-): 1.4 KSI 9.4 MPa  
Warning: Counting statistics may be the controlling error!

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7786.STR  
Sample Description:  
SBIR / WP / CW Holes / AF Std 16 / Baseline / Longitudinal  
ebm

\*Residual Stress.....: -19.0 KSI -131.2 MPa  
Counting Statistics Stress Error (+/-): 2.4 KSI 16.2 MPa  
Probable error.....(+/-): 1.4 KSI 9.4 MPa





===== TEC Stress Analyzer v1.64 =====  
 ===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7787.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 17 / Baseline / Longitudinal  
 ebn

Acquisition date & time: 11/04/2005 6:56pm

Material [hkl].....: Al 5083-H23 [333]  
 Depth.....: 0.0000000  
 Phi angle.....: 0.00  
 Collimator.....: Round\_4mm  
 Bracket.....: 160s  
 Peak Bounding Range [percent].....: 20  
 X-ray Target Description and Wavelength: copper 1.54056  
 PSI Oscillation Angle Range.....: 2.00  
 Spectra count time (PSI=0).....: 20.0  
 High Voltage(kV) and Beam Current(mA)...: 45.00 1.00  
 ADC Channels Full Scale.....: 256  
 Detector Calibration Coefficients:  
 A 1.99867E-07 B -7.91049E-05 C 0.0688651 D 148.0028

Psi	Sin <sup>2</sup> (psi)	Pk Chan	Intens	FWHM	Kalp Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00029	166.86	806.0	3.87	0.27682	161.94	0.779944	0.000043
5.0	0.00508	164.83	785.9	3.92	0.27522	161.82	0.780073	0.000038
10.0	0.02478	165.94	771.5	4.26	0.27800	161.89	0.780005	0.000047
15.0	0.05898	165.93	1008.6	3.93	0.27629	161.89	0.780003	0.000042
20.0	0.10611	167.49	889.5	3.99	0.27799	161.98	0.779906	0.000036
25.0	0.16596	166.47	1044.1	4.05	0.27735	161.92	0.779970	0.000040
30.0	0.23608	165.46	1071.1	4.14	0.27688	161.86	0.780034	0.000040
35.0	0.31363	165.85	1392.7	3.85	0.27581	161.88	0.780008	0.000028
40.0	0.39644	167.02	886.0	3.73	0.27600	161.95	0.779933	0.000036
45.0	0.48287	167.21	569.2	3.83	0.27688	161.96	0.779922	0.000044

Fitted Delta D vs Sin<sup>2</sup>(psi) Data:

D Spacing Intercept.....: 0.780001  
 Slope of Fitted Line.....: -0.0001193  
 Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -1.2 KSI -8.4 MPa

Counting Statistics Stress Error (+/-): 0.8 KSI 5.6 MPa

Probable error.....(+/-): 1.0 KSI 7.2 MPa

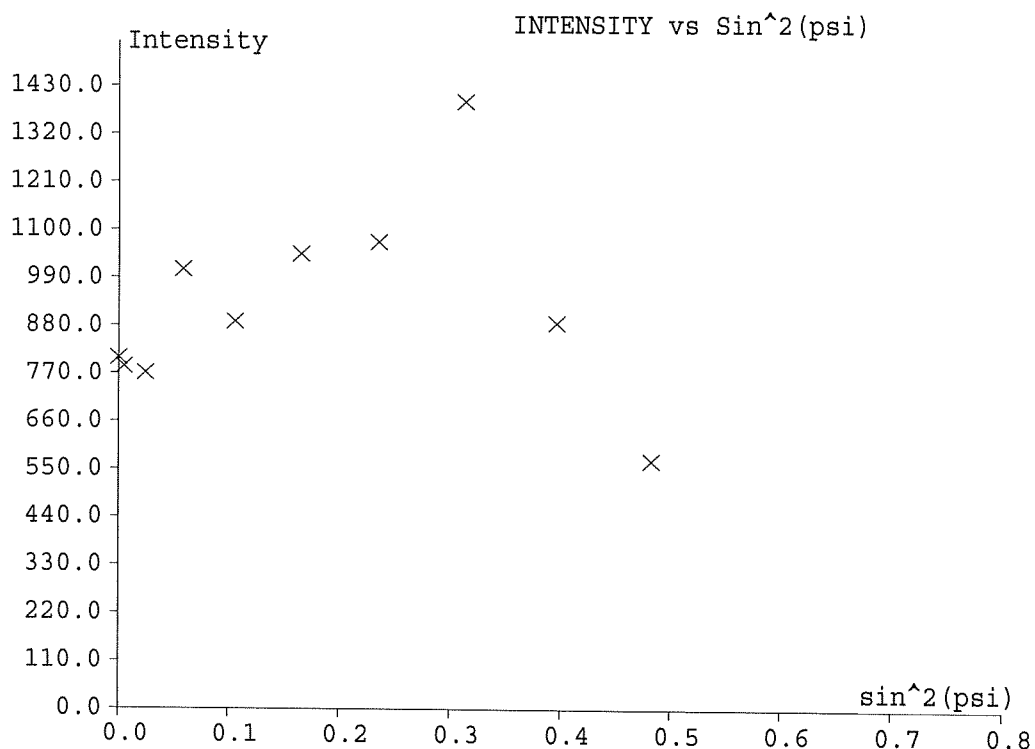
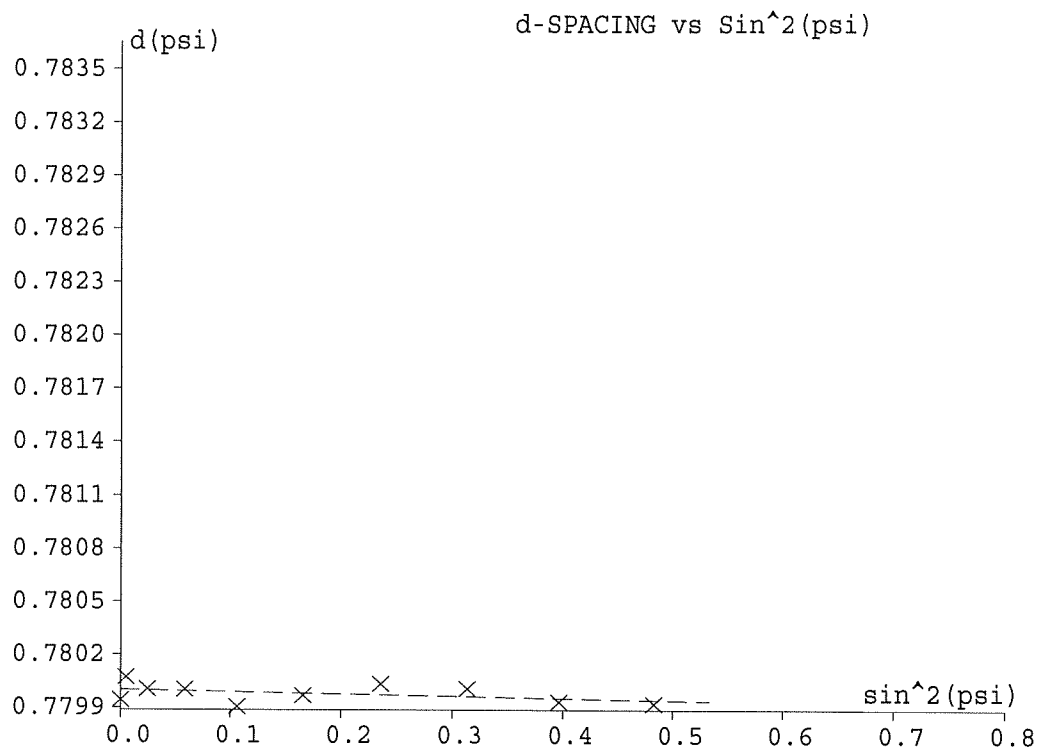
Warning: Counting statistics may be the controlling error!

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7787.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 17 / Baseline / Longitudinal  
ebm

*Residual Stress.....:	-1.2 KSI	-8.4 MPa
Counting Statistics Stress Error (+/-):	0.8 KSI	5.6 MPa
Probable error.....(+/-):	1.0 KSI	7.2 MPa



===== TEC Stress Analyzer v1.64 =====  
 ===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7788.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 18 / Baseline / Longitudinal  
 ebm

Acquisition date & time: 11/04/2005 7:02pm

Material [hkl].....: Al 5083-H23 [333]  
 Depth.....: 0.0000000  
 Phi angle.....: 0.00  
 Collimator.....: Round\_4mm  
 Bracket.....: 160s  
 Peak Bounding Range [percent].....: 20  
 X-ray Target Description and Wavelength: copper 1.54056  
 PSI Oscillation Angle Range.....: 2.00  
 Spectra count time (PSI=0).....: 20.0  
 High Voltage(kV) and Beam Current(mA)...: 45.00 1.00  
 ADC Channels Full Scale.....: 256  
 Detector Calibration Coefficients:  
 A 1.99867E-07 B -7.91049E-05 C 0.0688651 D 148.0028

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp	Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00026	164.99	610.4	4.08	0.27617		161.83	0.780063	0.000068
5.0	0.00503	165.58	903.2	3.92	0.27591		161.87	0.780026	0.000042
10.0	0.02493	164.96	905.5	4.16	0.27650		161.83	0.780066	0.000047
15.0	0.05947	163.90	791.9	3.89	0.27420		161.77	0.780131	0.000053
20.0	0.10650	166.21	933.8	3.86	0.27616		161.91	0.779985	0.000048
25.0	0.16643	165.21	1014.0	3.92	0.27556		161.85	0.780049	0.000036
30.0	0.23549	166.81	956.6	4.08	0.27786		161.94	0.779949	0.000040
35.0	0.31300	167.18	1316.3	3.81	0.27670		161.96	0.779924	0.000025
40.0	0.39473	170.52	672.5	4.25	0.28220		162.15	0.779717	0.000058
45.0	0.48186	169.18	612.1	3.76	0.27814		162.08	0.779797	0.000049

Fitted Delta D vs Sin^2(psi) Data:

D Spacing Intercept.....: 0.780090  
 Slope of Fitted Line.....: -0.0006665  
 Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -6.8 KSI -46.9 MPa

Counting Statistics Stress Error (+/-): 1.0 KSI 7.0 MPa

Probable error.....(+/-): 1.3 KSI 8.6 MPa

Warning: Counting statistics may be the controlling error!

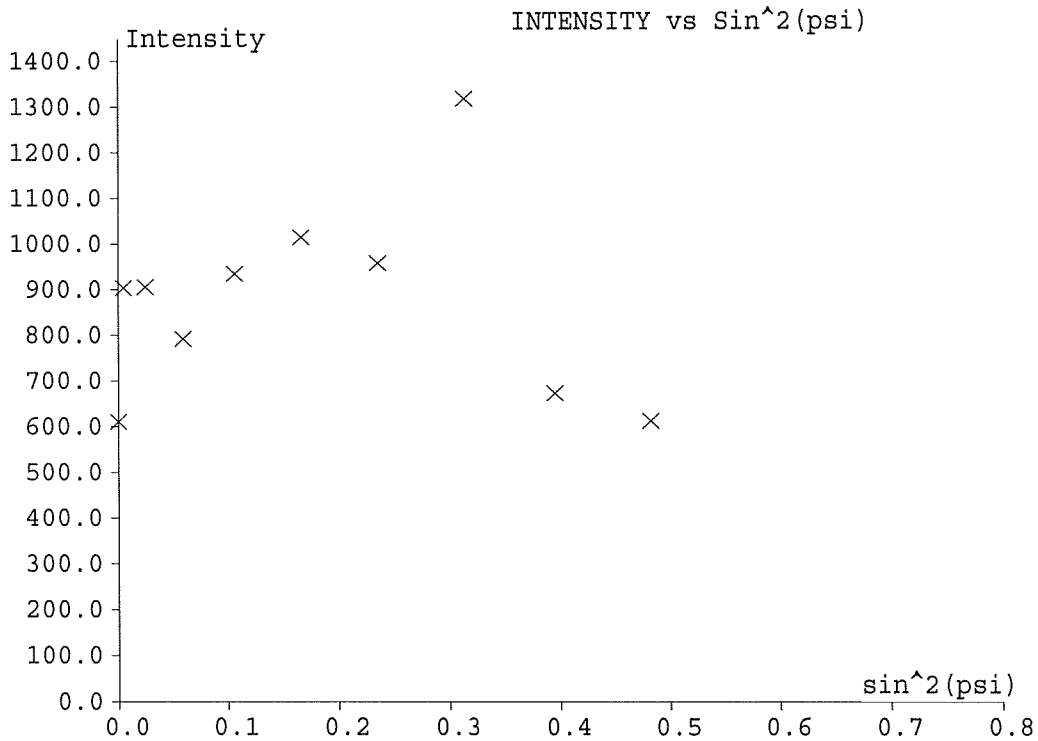
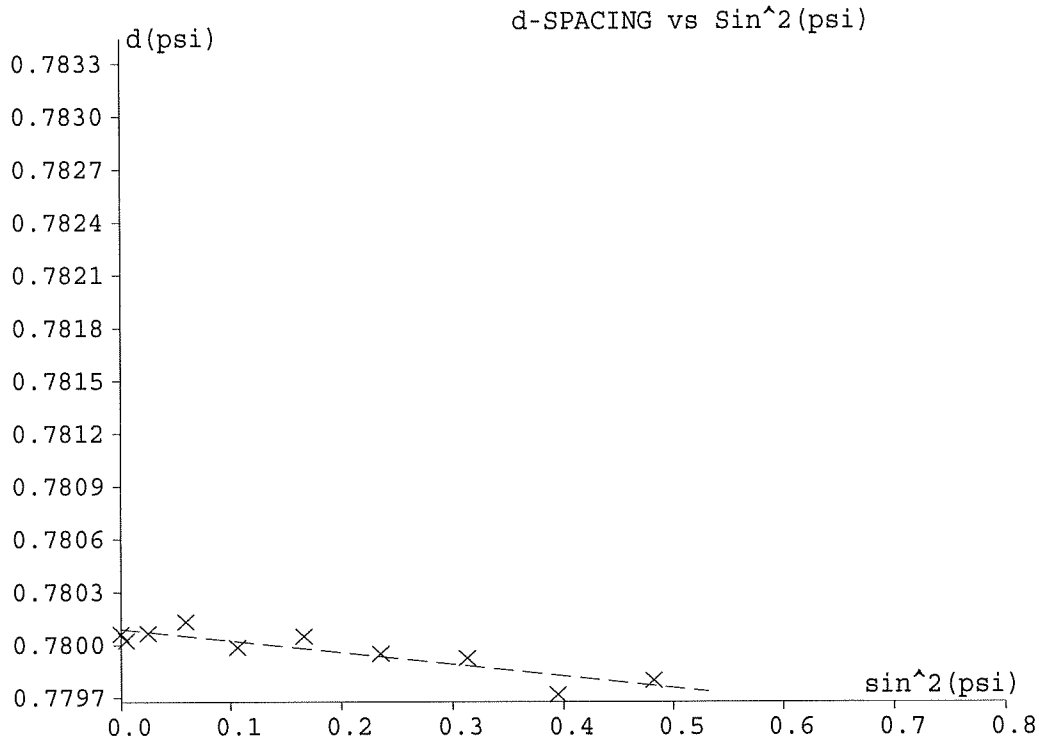
File: C:\STRESS\DATA\2143\2005\SBIR\50632\7788.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 18 / Baseline / Longitudinal

ebm

*Residual Stress.....:	-6.8 KSI	-46.9 MPa
Counting Statistics Stress Error (+/-):	1.0 KSI	7.0 MPa
Probable error.....(+/-):	1.3 KSI	8.6 MPa



===== TEC Stress Analyzer v1.64 =====  
===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7789.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 19 / Baseline / Longitudinal

ebm

Acquisition date & time: 11/04/2005 7:07pm

Material [hkl].....: Al 5083-H23 [333]  
Depth.....: 0.0000000  
Phi angle.....: 0.00  
Collimator.....: Round\_4mm  
Bracket.....: 160s  
Peak Bounding Range [percent].....: 20  
X-ray Target Description and Wavelength: copper 1.54056  
PSI Oscillation Angle Range.....: 2.00  
Spectra count time (PSI=0).....: 20.0  
High Voltage(kV) and Beam Current(mA)...: 45.00 1.00  
ADC Channels Full Scale.....: 256  
Detector Calibration Coefficients:  
A 1.99867E-07 B -7.91049E-05 C 0.0688651 D 148.0028

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00017	159.29	774.8	3.95	0.27086	161.50	0.780427	0.000055
5.0	0.00546	159.73	798.1	4.22	0.27255	161.53	0.780400	0.000077
10.0	0.02626	156.68	989.6	4.09	0.26951	161.35	0.780597	0.000041
15.0	0.06040	160.06	844.7	4.18	0.27255	161.55	0.780379	0.000050
20.0	0.10841	160.16	875.6	3.94	0.27151	161.55	0.780371	0.000059
25.0	0.16740	162.64	941.4	3.92	0.27327	161.70	0.780212	0.000039
30.0	0.23647	164.53	1238.5	3.84	0.27457	161.81	0.780092	0.000027
35.0	0.31194	169.45	997.0	4.02	0.28000	162.09	0.779782	0.000037
40.0	0.39374	172.47	899.8	4.01	0.28273	162.27	0.779594	0.000049
45.0	0.47991	173.03	611.1	3.85	0.28238	162.30	0.779559	0.000045

Fitted Delta D vs Sin^2(psi) Data:

D Spacing Intercept.....: 0.780520  
Slope of Fitted Line.....: -0.002113  
Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -21.6 KSI -148.7 MPa

Counting Statistics Stress Error (+/-): 1.0 KSI 7.0 MPa

Probable error.....(+/-): 1.9 KSI 12.8 MPa

Warning: Counting statistics may be the controlling error!

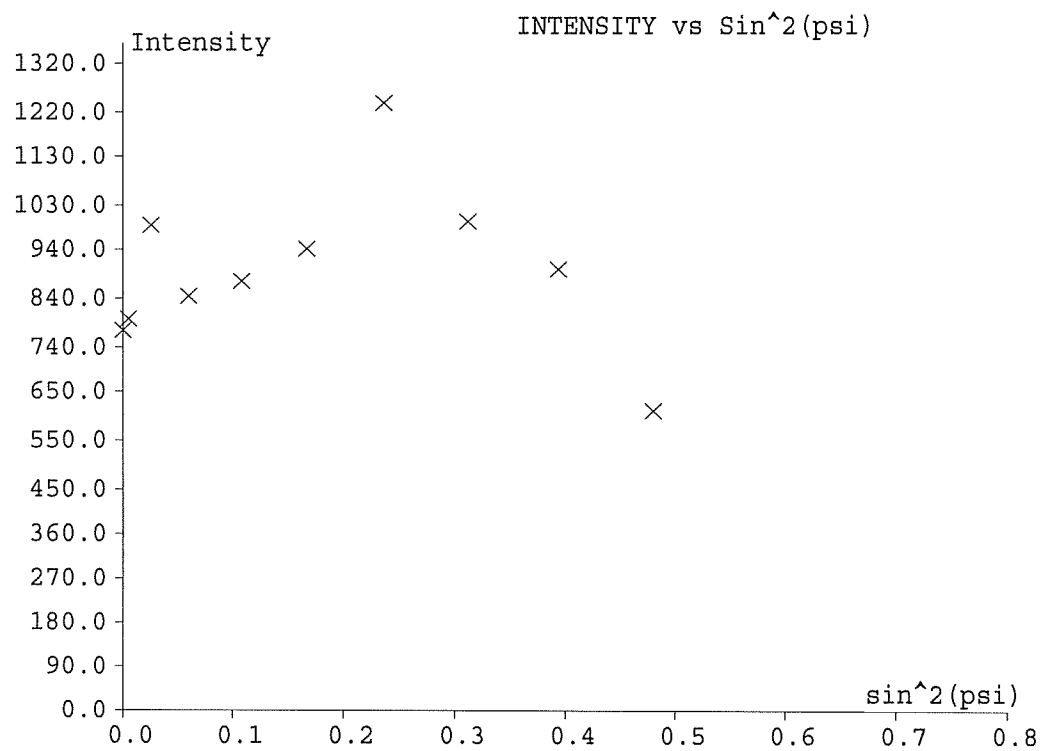
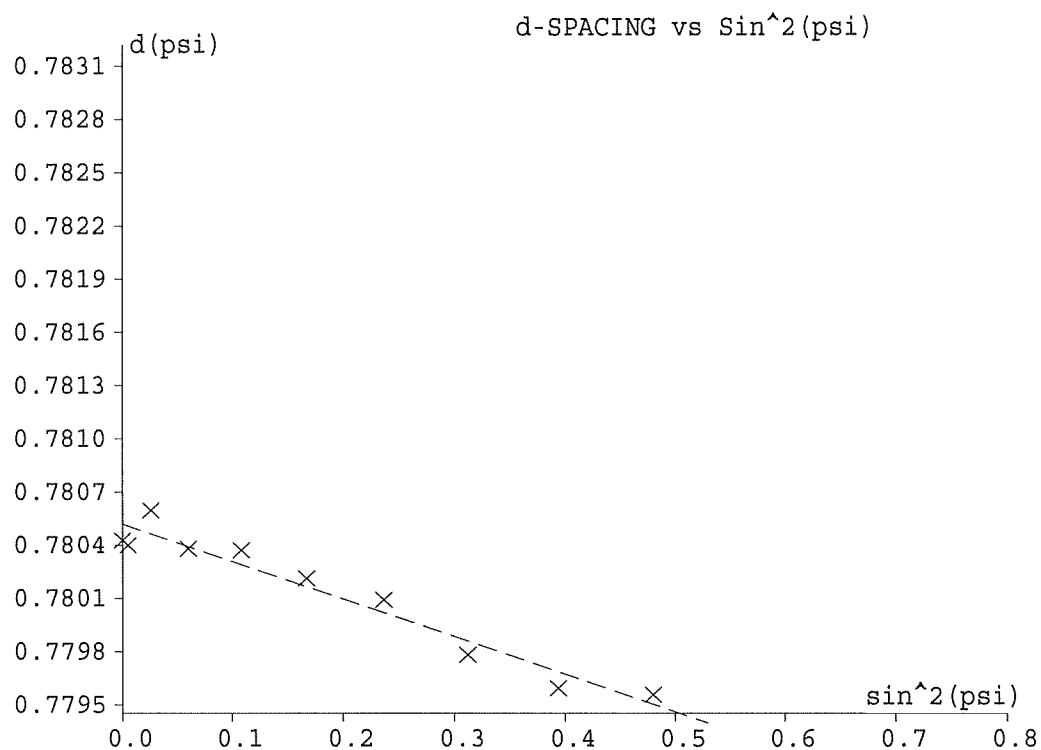
File: C:\STRESS\DATA\2143\2005\SBIR\50632\7789.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 19 / Baseline / Longitudinal

ebm

*Residual Stress.....:	-21.6 KSI	-148.7 MPa
Counting Statistics Stress Error (+/-):	1.0 KSI	7.0 MPa
Probable error.....(+/-):	1.9 KSI	12.8 MPa



===== TEC Stress Analyzer v1.64 =====  
 ===== Residual Stress Analysis Report =====

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7790.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 20 / Baseline / Longitudinal  
 ebm

Acquisition date & time: 11/04/2005 7:12pm

Material [hkl].....: Al 5083-H23 [333]  
 Depth.....: 0.0000000  
 Phi angle.....: 0.00  
 Collimator.....: Round\_4mm  
 Bracket.....: 160s  
 Peak Bounding Range [percent].....: 20  
 X-ray Target Description and Wavelength: copper 1.54056  
 PSI Oscillation Angle Range.....: 2.00  
 Spectra count time (PSI=0).....: 20.0  
 High Voltage(kV) and Beam Current(mA)...: 45.00 1.00  
 ADC Channels Full Scale.....: 256  
 Detector Calibration Coefficients:  
 A 1.99867E-07 B -7.91049E-05 C 0.0688651 D 148.0028

Psi	Sin^2(psi)	Pk Chan	Intens	FWHM	Kalp Cor A	2-Theta	D Spacing	St. Dev.
0.0	0.00023	163.56	757.7	3.77	0.27315	161.75	0.780152	0.000060
5.0	0.00505	165.31	893.4	3.86	0.27535	161.85	0.780042	0.000041
10.0	0.02480	165.77	864.5	3.81	0.27544	161.88	0.780012	0.000038
15.0	0.05879	166.74	1058.2	4.04	0.27758	161.94	0.779953	0.000043
20.0	0.10747	163.11	794.5	3.66	0.27196	161.73	0.780180	0.000036
25.0	0.16652	164.93	959.9	3.66	0.27361	161.83	0.780064	0.000033
30.0	0.23559	166.57	1140.7	3.90	0.27671	161.93	0.779963	0.000030
35.0	0.31338	166.39	1256.1	3.77	0.27572	161.92	0.779973	0.000029
40.0	0.39626	167.44	880.2	4.15	0.27880	161.98	0.779910	0.000047
45.0	0.48212	168.65	767.7	3.59	0.27630	162.05	0.779829	0.000031

Fitted Delta D vs Sin^2(psi) Data:

D Spacing Intercept.....: 0.780090  
 Slope of Fitted Line.....: -0.0004569  
 Material Stress Constant.....: 1.255E-07

\*Residual Stress.....: -4.7 KSI -32.2 MPa

Counting Statistics Stress Error (+/-): 0.8 KSI 5.6 MPa

Probable error.....(+/-): 1.5 KSI 10.5 MPa

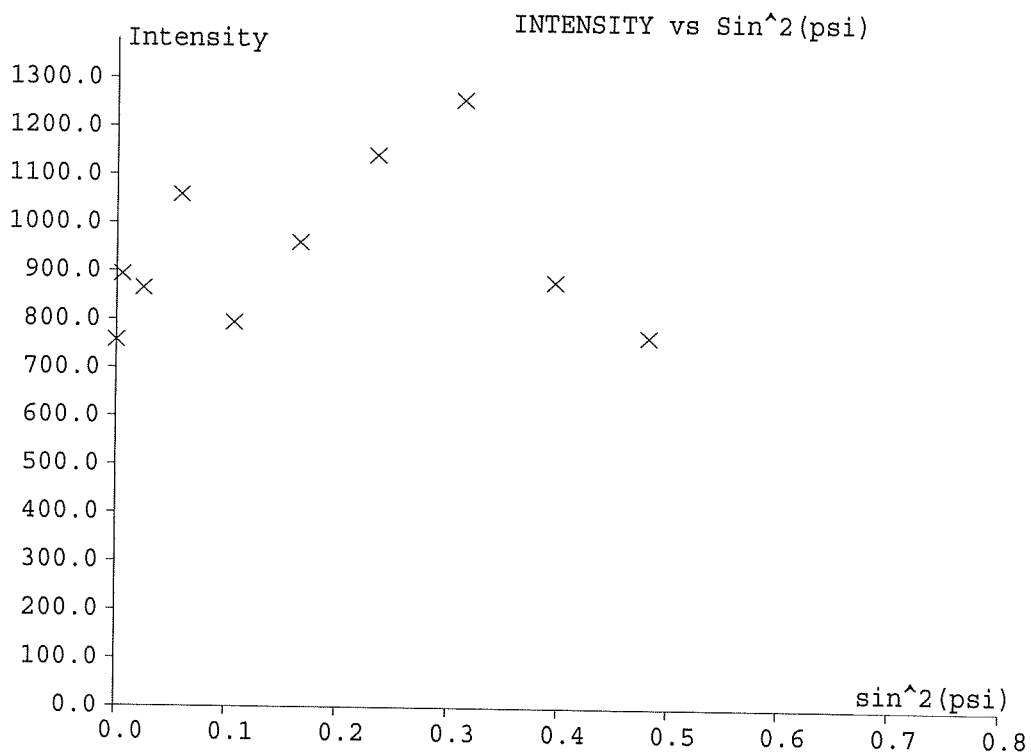
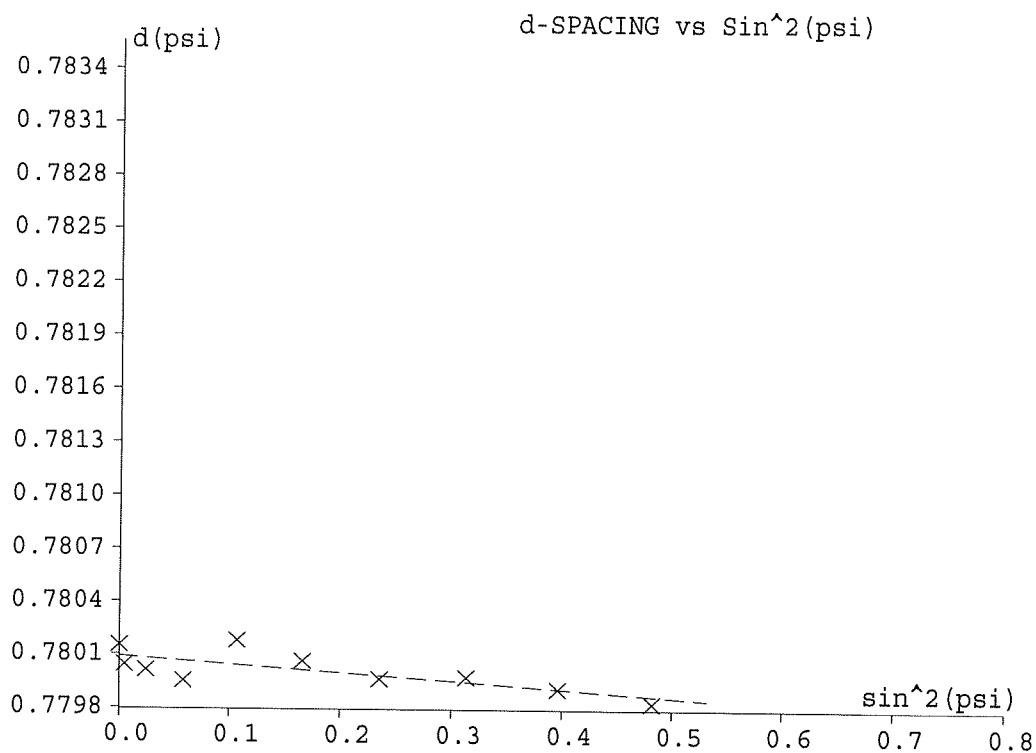
Warning: Counting statistics may be the controlling error!

File: C:\STRESS\DATA\2143\2005\SBIR\50632\7790.STR

Sample Description:

SBIR / WP / CW Holes / AF Std 20 / Baseline / Longitudinal  
ebm

*Residual Stress.....:	-4.7 KSI	-32.2 MPa
Counting Statistics Stress Error (+/-):	0.8 KSI	5.6 MPa
Probable error.....(+/-):	1.5 KSI	10.5 MPa







# TEC MAX Analysis Manager v1.0.26

## Single Exposure Residual Stress Report 2/17/2005 12:28:59 PM

**Description:** SBIR / AF Standard 1 / .05" from Edge / ebm  
(C:\SBIR DATA FROM MAX\SBIR - AF Standard 1 - 17Feb2005-12 32pm.mmt)

STRESS RESULTS		
	KSI	MPa
<b>Residual Stress:</b>	-17.3930	-119.9203
<b>Counting Statistics Error (+/-):</b>	3.2790	22.6076

Fitted Delta D vs Sin^2(Psi)			
<b>D-Spacing Intercept:</b>	0.779541	<b>Slope of Fitted Line:</b>	-0.001739

MEASUREMENT PARAMETERS			
<b>Material Type [hkl]:</b>	Aluminum Alloy [333]	<b>Stress Constant:</b>	1.255E-7
<b>Depth:</b>	0.00	<b>Phi Angle:</b>	0.00
<b>Count Time:</b>	230.0 sec	<b>Collimator:</b>	5mm Collimator
<b>X-Ray Tube:</b>	Copper (Moxtek)	<b>X-Ray Wavelength:</b>	1.5406 Angs.
<b>Tube Voltage:</b>	26.0 KV	<b>Tube Current:</b>	80.000 uA
<b>Filter:</b>	Nickel	<b>Orientation:</b>	Omega

DETECTOR CALIBRATION PARAMETERS						
Detector	Active Channels		Calibration Parameters			
	Start	End	A	B	C	D
S/N 00000008	46	459	1.644021E-8	-1.133431E-5	1.769458E-2	-1.670266E2
S/N 00000010	23	441	7.588810E-9	-5.801301E-6	1.680615E-2	1.590654E2

SPECTRUM DATA													
Psi	Sin^2(psi)	Peak Chnl	Intensity	FWHM	Peak Gross	Peak Net	2-Theta	Ka Corr	Ka2 Peak	D Spacing	Std. Dev.	Det. S/N	Flags
24.5	0.17456	227.64	120.0	2.74	28369	27593	162.608	0.00000	N/A	0.779238	0.000076	00000008	
41.5	0.43858	252.12	6.6	1.18	7667	1507	163.055	0.00000	N/A	0.778779	0.000038	00000010	

# TEC MAX Analysis Manager v1.0.26

## Single Exposure Residual Stress Report 2/17/2005 12:37:10 PM

Description: SBIR / AF Standard 1 / .10" from Edge / ebm  
(C:\SBIR DATA FROM MAX\SBIR - AF Standard 1 - 17Feb2005-12 42pm.mmt)

STRESS RESULTS		
	KSI	MPa
Residual Stress:	-14.4643	-99.7275
Counting Statistics Error (+/-):	2.6624	18.3568

Fitted Delta D vs Sin^2(Psi)			
D-Spacing Intercept:	0.780123	Slope of Fitted Line:	-0.001495

MEASUREMENT PARAMETERS			
Material Type [hkl]:	Aluminum Alloy [333]	Stress Constant:	1.255E-7
Depth:	0.00	Phi Angle:	0.00
Count Time:	300.0 sec	Collimator:	5mm Collimator
X-Ray Tube:	Copper (Moxtek)	X-Ray Wavelength:	1.5406 Angs.
Tube Voltage:	26.0 KV	Tube Current:	80.000 uA
Filter:	Nickel	Orientation:	Omega

DETECTOR CALIBRATION PARAMETERS						
Detector	Active Channels		Calibration Parameters			
	Start	End	A	B	C	D
S/N 00000008	46	459	1.644021E-8	-1.133431E-5	1.769458E-2	-1.670266E2
S/N 00000010	23	441	7.588810E-9	-5.801301E-6	1.680615E-2	1.590654E2

SPECTRUM DATA													
Psi	Sin^2(psi)	Peak Chnl	Intensity	FWHM	Peak Gross	Peak Net	2-Theta	Ka Corr	Ka2 Peak	D Spacing	Std. Dev.	Det. S/N	Flags
24.5	0.17845	189.01	132.1	2.41	40625	39620	162.024	0.00000	N/A	0.779856	0.000025	00000008	
41.5	0.44429	209.22	2.7	1.06	810	804	162.397	0.00000	N/A	0.779458	0.000064	00000010	

# TEC MAX Analysis Manager v1.0.26

## Single Exposure Residual Stress Report

2/17/2005 12:52:22 PM

**Description:** SBIR / AF Standard 1 / .15" from Edge / ebm  
(C:\SBIR DATA FROM MAX\SBIR - AF Standard 1 - 17Feb2005-12 57pm.mmt)

STRESS RESULTS		
	KSI	MPa
Residual Stress:	-16.6326	-114.6774
Counting Statistics Error (+/-):	1.3000	8.9632

Fitted Delta D vs Sin <sup>2</sup> (Psi)			
D-Spacing Intercept:	0.780240	Slope of Fitted Line:	-0.001726

MEASUREMENT PARAMETERS			
Material Type [hkl]:	Aluminum Alloy [333]	Stress Constant:	1.255E-7
Depth:	0.00	Phi Angle:	0.00
Count Time:	300.0 sec	Collimator:	5mm Collimator
X-Ray Tube:	Copper (Moxtek)	X-Ray Wavelength:	1.5406 Angs.
Tube Voltage:	26.0 KV	Tube Current:	80.000 uA
Filter:	Nickel	Orientation:	Omega

DETECTOR CALIBRATION PARAMETERS						
Detector	Active Channels		Calibration Parameters			
	Start	End	A	B	C	D
S/N 00000008	46	459	1.644021E-8	-1.133431E-5	1.769458E-2	-1.670266E2
S/N 00000010	23	441	7.588810E-9	-5.801301E-6	1.680615E-2	1.590654E2

SPECTRUM DATA													
Psi	Sin <sup>2</sup> (psi)	Peak Chnl	Intensity	FWHM	Peak Gross	Peak Net	2-Theta	Ka Corr	Ka2 Peak	D Spacing	Std. Dev.	Det. S/N	Flags
24.5	0.17892	184.39	173.8	1.80	53339	52125	161.954	0.00000	N/A	0.779932	0.000015	00000008	
41.5	0.44441	208.30	110.4	3.27	34721	33113	162.383	0.00000	N/A	0.779473	0.000030	00000010	

# TEC MAX Analysis Manager v1.0.26

## Single Exposure Residual Stress Report

2/17/2005 1:52:45 PM

Description: SBIR / AF Standard 2 / .05" from Edge / ebm  
(C:\SBIR DATA FROM MAX\SBIR - AF Standard 2 - 17Feb2005-01 57pm.mmt)

STRESS RESULTS		
	KSI	MPa
Residual Stress:	-27.2320	-187.7577
Counting Statistics Error (+/-):	1.5903	10.9647

Fitted Delta D vs Sin^2(Psi)			
D-Spacing Intercept:	0.780236	Slope of Fitted Line:	-0.002798

MEASUREMENT PARAMETERS			
Material Type [hkl]:	Aluminum Alloy [333]	Stress Constant:	1.255E-7
Depth:	0.00	Phi Angle:	0.00
Count Time:	300.0 sec	Collimator:	5mm Collimator
X-Ray Tube:	Copper (Moxtek)	X-Ray Wavelength:	1.5406 Angs.
Tube Voltage:	26.0 KV	Tube Current:	80.000 uA
Filter:	Nickel	Orientation:	Omega

DETECTOR CALIBRATION PARAMETERS						
Detector	Active Channels		Calibration Parameters			
	Start	End	A	B	C	D
S/N 00000008	46	459	1.644021E-8	-1.133431E-5	1.769458E-2	-1.670266E2
S/N 00000010	23	441	7.588810E-9	-5.801301E-6	1.680615E-2	1.590654E2

SPECTRUM DATA													
Psi	Sin^2(psi)	Peak Chnl	Intensity	FWHM	Peak Gross	Peak Net	2-Theta	Ka Corr	Ka2 Peak	D Spacing	Std. Dev.	Det. S/N	Flags
24.5	0.17771	196.23	68.4	1.79	21481	20521	162.133	0.00000	N/A	0.779738	0.000024	00000008	
41.5	0.44049	237.75	54.0	2.03	18004	16202	162.835	0.00000	N/A	0.779003	0.000033	00000010	

# TEC MAX Analysis Manager v1.0.26

## Single Exposure Residual Stress Report

2/17/2005 2:06:27 PM

Description: SBIR / AF Standard 2 / .10" from Edge / ebm  
(E:\SBIR - AF Standard 2 - 17Feb2005-02 11pm.mmt)

STRESS RESULTS		
	KSI	MPa
Residual Stress:	7.4504	51.3689
Counting Statistics Error (+/-):	4.1125	28.3546

Fitted Delta D vs Sin^2(Psi)			
D-Spacing Intercept:	0.779391	Slope of Fitted Line:	0.000756

MEASUREMENT PARAMETERS			
Material Type [hkl]:	Aluminum Alloy [333]	Stress Constant:	1.255E-7
Depth:	0.00	Phi Angle:	0.00
Count Time:	301.0 sec	Collimator:	5mm Collimator
X-Ray Tube:	Copper (Moxtek)	X-Ray Wavelength:	1.5406 Angs.
Tube Voltage:	26.0 KV	Tube Current:	80.000 uA
Filter:	Nickel	Orientation:	Omega

DETECTOR CALIBRATION PARAMETERS						
Detector	Active Channels		Calibration Parameters			
	Start	End	A	B	C	D
S/N 00000008	46	459	1.644021E-8	-1.133431E-5	1.769458E-2	-1.670266E2
S/N 00000010	23	441	7.588810E-9	-5.801301E-6	1.680615E-2	1.590654E2

SPECTRUM DATA													
Psi	Sin^2(psi)	Peak Chnl	Intensity	FWHM	Peak Gross	Peak Net	2-Theta	Ka Corr	Ka2 Peak	D Spacing	Std. Dev.	Det. S/N	Flags
24.5	0.17638	209.53	103.6	1.76	32781	31187	162.335	0.00000	N/A	0.779525	0.000019	00000008	
41.5	0.44650	192.67	110.3	3.35	36612	33192	162.142	0.00000	N/A	0.779729	0.000107	00000010	

# TEC MAX Analysis Manager v1.0.26

## Single Exposure Residual Stress Report 2/17/2005 2:39:26 PM

**Description:** SBIR / AF Standard 3 / .10" from Edge / ebm  
(C:\SBIR DATA FROM MAX\SBIR - AF Standard 3 - 17Feb2005-02 44pm.mmt)

STRESS RESULTS		
	KSI	MPa
<b>Residual Stress:</b>	-4.3795	-30.1957
<b>Counting Statistics Error (+/-):</b>	1.6045	11.0629

Fitted Delta D vs Sin^2(Psi)			
<b>D-Spacing Intercept:</b>	0.780120	<b>Slope of Fitted Line:</b>	-0.000457

MEASUREMENT PARAMETERS			
<b>Material Type [hkl]:</b>	Aluminum Alloy [333]	<b>Stress Constant:</b>	1.255E-7
<b>Depth:</b>	0.00	<b>Phi Angle:</b>	0.00
<b>Count Time:</b>	301.0 sec	<b>Collimator:</b>	5mm Collimator
<b>X-Ray Tube:</b>	Copper (Moxtek)	<b>X-Ray Wavelength:</b>	1.5406 Angs.
<b>Tube Voltage:</b>	26.0 KV	<b>Tube Current:</b>	80.000 uA
<b>Filter:</b>	Nickel	<b>Orientation:</b>	Omega

DETECTOR CALIBRATION PARAMETERS						
Detector	Active Channels		Calibration Parameters			
	Start	End	A	B	C	D
S/N 00000008	46	459	1.644021E-8	-1.133431E-5	1.769458E-2	-1.670266E2
S/N 00000010	23	441	7.588810E-9	-5.801301E-6	1.680615E-2	1.590654E2

SPECTRUM DATA													
Psi	Sin^2(psi)	Peak Chnl	Intensity	FWHM	Peak Gross	Peak Net	2-Theta	Ka Corr	Ka2 Peak	D Spacing	Std. Dev.	Det. S/N	Flags
24.5	0.17957	194.34	106.8	2.40	32824	32132	161.856	0.24913	N/A	0.780038	0.000031	00000008	
41.5	0.44801	198.21	62.4	2.64	19934	18775	161.969	0.25896	N/A	0.779915	0.000028	00000010	

# TEC MAX Analysis Manager v1.0.26

## Single Exposure Residual Stress Report 2/17/2005 2:46:59 PM

**Description:** SBIR / AF Standard 3 / .15" from Edge / ebm  
(E:\SBIR - AF Standard 3 - 17Feb2005-02 51pm.mmt)

STRESS RESULTS		
	KSI	MPa
<b>Residual Stress:</b>	3.5071	24.1806
<b>Counting Statistics Error (+/-):</b>	7.5543	52.0849

Fitted Delta D vs Sin^2(Psi)			
<b>D-Spacing Intercept:</b>	0.779874	<b>Slope of Fitted Line:</b>	0.000364

MEASUREMENT PARAMETERS			
<b>Material Type [hkl]:</b>	Aluminum Alloy [333]	<b>Stress Constant:</b>	1.255E-7
<b>Depth:</b>	0.00	<b>Phi Angle:</b>	0.00
<b>Count Time:</b>	300.0 sec	<b>Collimator:</b>	5mm Collimator
<b>X-Ray Tube:</b>	Copper (Moxtek)	<b>X-Ray Wavelength:</b>	1.5406 Angs.
<b>Tube Voltage:</b>	26.0 KV	<b>Tube Current:</b>	80.000 uA
<b>Filter:</b>	Nickel	<b>Orientation:</b>	Omega

DETECTOR CALIBRATION PARAMETERS						
Detector	Active Channels		Calibration Parameters			
	Start	End	A	B	C	D
S/N 00000008	46	459	1.644021E-8	-1.133431E-5	1.769458E-2	-1.670266E2
S/N 00000010	23	441	7.588810E-9	-5.801301E-6	1.680615E-2	1.590654E2

SPECTRUM DATA													
Psi	Sin^2(psi)	Peak Chnl	Intensity	FWHM	Peak Gross	Peak Net	2-Theta	Ka Corr	Ka2 Peak	D Spacing	Std. Dev.	Det. S/N	Flags
24.5	0.17897	183.90	141.1	2.14	43207	42324	161.946	0.00000	N/A	0.779940	0.000023	00000008	
41.5	0.44899	174.11	78.5	3.13	25496	23545	161.856	0.00000	N/A	0.780038	0.000198	00000010	



# TEC MAX Analysis Manager v1.0.26

## Single Exposure Residual Stress Report

2/17/2005 3:23:37 PM

Description: SBIR / AF Standard 5 / .10" from Edge / ebm  
(E:\SBIR - AF Standard 5 - 17Feb2005-03 28pm.mmt)

STRESS RESULTS		
	KSI	MPa
Residual Stress:	0.3758	2.5908
Counting Statistics Error (+/-):	1.0387	7.1618

Fitted Delta D vs Sin^2(Psi)			
D-Spacing Intercept:	0.779557	Slope of Fitted Line:	0.000038

MEASUREMENT PARAMETERS			
Material Type [hkl]:	Aluminum Alloy [333]	Stress Constant:	1.255E-7
Depth:	0.00	Phi Angle:	0.00
Count Time:	300.0 sec	Collimator:	5mm Collimator
X-Ray Tube:	Copper (Moxtek)	X-Ray Wavelength:	1.5406 Angs.
Tube Voltage:	26.0 KV	Tube Current:	80.000 uA
Filter:	Nickel	Orientation:	Omega

DETECTOR CALIBRATION PARAMETERS						
Active Channels			Calibration Parameters			
Detector	Start	End	A	B	C	D
S/N 00000008	46	459	1.644021E-8	-1.133431E-5	1.769458E-2	-1.670266E2
S/N 00000010	23	441	7.588810E-9	-5.801301E-6	1.680615E-2	1.590654E2

SPECTRUM DATA													
Psi	Sin^2(psi)	Peak Chnl	Intensity	FWHM	Peak Gross	Peak Net	2-Theta	Ka Corr	Ka2 Peak	D Spacing	Std. Dev.	Det. S/N	Flags
24.5	0.17662	207.07	147.7	2.02	45144	44318	162.297	0.00000	N/A	0.779564	0.000018	00000008	
41.5	0.44524	202.11	93.3	2.30	29108	27997	162.288	0.00000	N/A	0.779574	0.000021	00000010	

# TEC MAX Analysis Manager v1.0.26

## Single Exposure Residual Stress Report 2/17/2005 3:35:37 PM

**Description:** SBIR / AF Standard 5 / .15" from Edge / ebm  
(C:\SBIR DATA FROM MAX\SBIR - AF Standard 5 - 17Feb2005-03 40pm.mmt)

STRESS RESULTS		
	KSI	MPa
<b>Residual Stress:</b>	-0.9662	-6.6616
<b>Counting Statistics Error (+/-):</b>	1.4446	9.9599

Fitted Delta D vs Sin^2(Psi)			
<b>D-Spacing Intercept:</b>	0.779503	<b>Slope of Fitted Line:</b>	-0.000098

MEASUREMENT PARAMETERS			
<b>Material Type [hkl]:</b>	Aluminum Alloy [333]	<b>Stress Constant:</b>	1.255E-7
<b>Depth:</b>	0.00	<b>Phi Angle:</b>	0.00
<b>Count Time:</b>	301.0 sec	<b>Collimator:</b>	5mm Collimator
<b>X-Ray Tube:</b>	Copper (Moxtek)	<b>X-Ray Wavelength:</b>	1.5406 Angs.
<b>Tube Voltage:</b>	26.0 KV	<b>Tube Current:</b>	80.000 uA
<b>Filter:</b>	Nickel	<b>Orientation:</b>	Omega

DETECTOR CALIBRATION PARAMETERS						
Active Channels			Calibration Parameters			
Detector	Start	End	A	B	C	D
S/N 00000008	46	459	1.644021E-8	-1.133431E-5	1.769458E-2	-1.670266E2
S/N 00000010	23	441	7.588810E-9	-5.801301E-6	1.680615E-2	1.590654E2

SPECTRUM DATA													
Psi	Sin^2(psi)	Peak Chnl	Intensity	FWHM	Peak Gross	Peak Net	2-Theta	Ka Corr	Ka2 Peak	D Spacing	Std. Dev.	Det. S/N	Flags
24.5	0.17613	229.82	120.8	2.87	36816	36351	162.371	0.26962	N/A	0.779486	0.000019	00000008	
41.5	0.44430	225.62	90.8	2.39	28423	27342	162.396	0.25284	N/A	0.779459	0.000033	00000010	

# TEC MAX Analysis Manager v1.0.26

## Single Exposure Residual Stress Report 8/3/2005 3:08:49 PM

**Description:** SBIR / AF Standard 6 / 0.10" from Edge / Hoop / jb  
(C:\SBIR DATA FROM MAX\SBIR - AF Standard 6 - 03Aug2005-03 13pm.set)

STRESS RESULTS		
	KSI	MPa
<b>Residual Stress:</b>	-33.1129	-228.3049
<b>Counting Statistics Error (+/-):</b>	2.4204	16.6877

Fitted Delta D vs Sin^2(Psi)			
<b>D-Spacing Intercept:</b>	0.780703	<b>Slope of Fitted Line:</b>	-0.003461

MEASUREMENT PARAMETERS			
<b>Material Type [hkl]:</b>	Aluminum Alloy [333]	<b>Stress Constant:</b>	1.255E-7
<b>Depth:</b>	0.00	<b>Phi Angle:</b>	0.00
<b>Count Time:</b>	300.0 sec	<b>Collimator:</b>	5mm Collimator
<b>X-Ray Tube:</b>	Copper (Moxtek)	<b>X-Ray Wavelength:</b>	1.5406 Angs.
<b>Tube Voltage:</b>	26.0 KV	<b>Tube Current:</b>	80.000 uA
<b>Filter:</b>	Nickel	<b>Orientation:</b>	Omega

DETECTOR CALIBRATION PARAMETERS						
Active Channels			Calibration Parameters			
Detector	Start	End	A	B	C	D
S/N 00000007	61	451	8.675221E-9	-6.629224E-6	1.703235E-2	-1.669914E2
S/N 00000011	61	451	1.123196E-8	-8.658852E-6	2.002985E-2	1.582417E2

SPECTRUM DATA													
Psi	Sin^2(psi)	Peak Chnl	Intensity	FWHM	Peak Gross	Peak Net	2-Theta	Ka Corr	Ka2 Peak	D Spacing	Std. Dev.	Det. S/N	Flags
24.5	0.17972	175.11	102.4	1.76	31110	30716	161.834	N/A	163.690	0.780081	0.000031	00000007	BM
41.5	0.44176	239.05	139.3	2.92	44572	41779	162.689	N/A	164.608	0.779174	0.000054	00000011	BM

# TEC MAX Analysis Manager v1.0.26

## Single Exposure Residual Stress Report 8/3/2005 3:48:10 PM

Description: SBIR / AF Standard 7 / 0.05" from Edge / Hoop / jb  
(C:\SBIR DATA FROM MAX\SBIR - AF Standard 7 - 03Aug2005-03 53pm.set)

STRESS RESULTS		
	KSI	MPa
Residual Stress:	-33.1033	-228.2387
Counting Statistics Error (+/-):	1.3845	9.5456

Fitted Delta D vs Sin^2(Psi)			
D-Spacing Intercept:	0.780893	Slope of Fitted Line:	-0.003492

MEASUREMENT PARAMETERS			
Material Type [hkl]:	Aluminum Alloy [333]	Stress Constant:	1.255E-7
Depth:	0.00	Phi Angle:	0.00
Count Time:	301.0 sec	Collimator:	5mm Collimator
X-Ray Tube:	Copper (Moxtek)	X-Ray Wavelength:	1.5406 Angs.
Tube Voltage:	26.0 KV	Tube Current:	80.000 uA
Filter:	Nickel	Orientation:	Omega

DETECTOR CALIBRATION PARAMETERS						
Detector	Active Channels		Calibration Parameters			
	Start	End	A	B	C	D
S/N 00000007	61	451	8.675221E-9	-6.629224E-6	1.703235E-2	-1.669914E2
S/N 00000011	61	451	1.123196E-8	-8.658852E-6	2.002985E-2	1.582417E2

SPECTRUM DATA													
Psi	Sin^2(psi)	Peak Chnl	Intensity	FWHM	Peak Gross	Peak Net	2-Theta	Ka Corr	Ka2 Peak	D Spacing	Std. Dev.	Det. S/N	Flags
24.5	0.18082	164.47	127.3	1.61	38872	38322	161.669	N/A	163.439	0.780262	0.000024	00000007	BM
41.5	0.44319	229.81	103.8	2.15	32151	31252	162.524	N/A	164.570	0.779346	0.000026	00000011	BM

# TEC MAX Analysis Manager v1.0.26

## Single Exposure Residual Stress Report 8/3/2005 3:38:41 PM

**Description:** SBIR / AF Standard 7 / 0.10" from Edge / Hoop / jb  
(C:\SBIR DATA FROM MAX\SBIR - AF Standard 7 - 03Aug2005-03 43pm.set)

STRESS RESULTS		
	KSI	MPa
<b>Residual Stress:</b>	-15.3771	-106.0215
<b>Counting Statistics Error (+/-):</b>	1.3019	8.9760

Fitted Delta D vs Sin^2(Psi)			
<b>D-Spacing Intercept:</b>	0.780497	<b>Slope of Fitted Line:</b>	-0.001616

MEASUREMENT PARAMETERS			
<b>Material Type [hkl]:</b>	Aluminum Alloy [333]	<b>Stress Constant:</b>	1.255E-7
<b>Depth:</b>	0.00	<b>Phi Angle:</b>	0.00
<b>Count Time:</b>	300.0 sec	<b>Collimator:</b>	5mm Collimator
<b>X-Ray Tube:</b>	Copper (Moxtek)	<b>X-Ray Wavelength:</b>	1.5406 Angs.
<b>Tube Voltage:</b>	26.0 KV	<b>Tube Current:</b>	80.000 uA
<b>Filter:</b>	Nickel	<b>Orientation:</b>	Omega

DETECTOR CALIBRATION PARAMETERS						
Detector	Active Channels		Calibration Parameters			
	Start	End	A	B	C	D
S/N 00000007	61	451	8.675221E-9	-6.629224E-6	1.703235E-2	-1.669914E2
S/N 00000011	61	451	1.123196E-8	-8.658852E-6	2.002985E-2	1.582417E2

SPECTRUM DATA													
Psi	Sin^2(psi)	Peak Chnl	Intensity	FWHM	Peak Gross	Peak Net	2-Theta	Ka Corr	Ka2 Peak	D Spacing	Std. Dev.	Det. S/N	Flags
24.5	0.18048	167.77	160.5	1.61	48662	48142	161.720	N/A	163.667	0.780206	0.000021	00000007	BM
41.5	0.44671	207.07	156.5	1.78	47852	46936	162.118	N/A	163.626	0.779775	0.000026	00000011	BM

# TEC MAX Analysis Manager v1.0.26

## Single Exposure Residual Stress Report 8/3/2005 3:28:31 PM

Description: SBIR / AF Standard 7 / 0.15" from Edge / Hoop / jb  
(C:\SBIR DATA FROM MAX\SBIR - AF Standard 7 - 03Aug2005-03 33pm.set)

STRESS RESULTS		
	KSI	MPa
Residual Stress:	0.9458	6.5209
Counting Statistics Error (+/-):	1.3499	9.3070

Fitted Delta D vs Sin^2(Psi)			
D-Spacing Intercept:	0.780321	Slope of Fitted Line:	0.000100

MEASUREMENT PARAMETERS			
Material Type [hkl]:	Aluminum Alloy [333]	Stress Constant:	1.255E-7
Depth:	0.00	Phi Angle:	0.00
Count Time:	300.0 sec	Collimator:	5mm Collimator
X-Ray Tube:	Copper (Moxtek)	X-Ray Wavelength:	1.5406 Angs.
Tube Voltage:	26.0 KV	Tube Current:	80.000 uA
Filter:	Nickel	Orientation:	Omega

DETECTOR CALIBRATION PARAMETERS						
Detector	Active Channels		Calibration Parameters			
	Start	End	A	B	C	D
S/N 00000007	61	451	8.675221E-9	-6.629224E-6	1.703235E-2	-1.669914E2
S/N 00000011	61	451	1.123196E-8	-8.658852E-6	2.002985E-2	1.582417E2

SPECTRUM DATA													
Psi	Sin^2(psi)	Peak Chnl	Intensity	FWHM	Peak Gross	Peak Net	2-Theta	Ka Corr	Ka2 Peak	D Spacing	Std. Dev.	Det. S/N	Flags
24.5	0.18129	159.98	179.7	1.54	54545	53897	161.599	N/A	163.410	0.780339	0.000019	00000007	BM
41.5	0.45143	176.82	168.3	1.33	51991	50492	161.575	N/A	163.373	0.780366	0.000030	00000011	BM

# TEC MAX Analysis Manager v1.0.26

## Single Exposure Residual Stress Report 8/10/2005 1:27:41 PM

**Description:** SBIR / AF Standard 8 / 0.05 from Edge / Hoop / jb  
(C:\SBIR DATA FROM MAX\SBIR - AF Standard 8 - 10Aug2005-01 32pm.set)

STRESS RESULTS		
	KSI	MPa
<b>Residual Stress:</b>	-27.5135	-189.6983
<b>Counting Statistics Error (+/-):</b>	1.8919	13.0442

Fitted Delta D vs Sin^2(Psi)			
<b>D-Spacing Intercept:</b>	0.780768	<b>Slope of Fitted Line:</b>	-0.002902

MEASUREMENT PARAMETERS			
<b>Material Type [hkl]:</b>	Aluminum Alloy [333]	<b>Stress Constant:</b>	1.255E-7
<b>Depth:</b>	0.00	<b>Phi Angle:</b>	0.00
<b>Count Time:</b>	300.0 sec	<b>Collimator:</b>	5mm Collimator
<b>X-Ray Tube:</b>	Copper (Moxtek)	<b>X-Ray Wavelength:</b>	1.5406 Angs.
<b>Tube Voltage:</b>	26.0 KV	<b>Tube Current:</b>	80.000 uA
<b>Filter:</b>	Nickel	<b>Orientation:</b>	Omega

DETECTOR CALIBRATION PARAMETERS						
Detector	Active Channels		Calibration Parameters			
	Start	End	A	B	C	D
S/N 00000007	61	451	8.675221E-9	-6.629224E-6	1.703235E-2	-1.669914E2
S/N 00000011	61	451	1.123196E-8	-8.658852E-6	2.002985E-2	1.582417E2

SPECTRUM DATA													
Psi	Sin^2(psi)	Peak Chnl	Intensity	FWHM	Peak Gross	Peak Net	2-Theta	Ka Corr	Ka2 Peak	D Spacing	Std. Dev.	Det. S/N	Flags
24.5	0.18083	164.37	62.1	1.68	18823	18635	161.668	N/A	163.858	0.780243	0.000040	00000007	
41.5	0.44446	221.64	99.4	0.81	30140	29831	162.378	N/A	164.676	0.779479	0.000028	00000011	B

# TEC MAX Analysis Manager v1.0.26

## Single Exposure Residual Stress Report 8/10/2005 1:15:51 PM

Description: SBIR / AF Standard 8 / 0.10 from Edge / Hoop / jb  
(C:\SBIR DATA FROM MAX\SBIR - AF Standard 8 - 10Aug2005-01 20pm.set)

STRESS RESULTS		
	KSI	MPa
Residual Stress:	-11.1079	-76.5858
Counting Statistics Error (+/-):	1.5870	10.9418

Fitted Delta D vs Sin^2(Psi)			
D-Spacing Intercept:	0.780295	Slope of Fitted Line:	-0.001161

MEASUREMENT PARAMETERS			
Material Type [hkl]:	Aluminum Alloy [333]	Stress Constant:	1.255E-7
Depth:	0.00	Phi Angle:	0.00
Count Time:	300.0 sec	Collimator:	5mm Collimator
X-Ray Tube:	Copper (Moxtek)	X-Ray Wavelength:	1.5406 Angs.
Tube Voltage:	26.0 KV	Tube Current:	80.000 uA
Filter:	Nickel	Orientation:	Omega

DETECTOR CALIBRATION PARAMETERS						
Detector	Active Channels		Calibration Parameters			
	Start	End	A	B	C	D
S/N 00000007	61	451	8.675221E-9	-6.629224E-6	1.703235E-2	-1.669914E2
S/N 00000011	61	451	1.123196E-8	-8.658852E-6	2.002985E-2	1.582417E2

SPECTRUM DATA													
Psi	Sin^2(psi)	Peak Chnl	Intensity	FWHM	Peak Gross	Peak Net	2-Theta	Ka Corr	Ka2 Peak	D Spacing	Std. Dev.	Det. S/N	Flags
24.5	0.17987	173.65	113.4	2.09	34901	34014	161.812	N/A	163.895	0.780086	0.000031	00000007	B
41.5	0.44688	206.01	8.8	0.61	2675	2637	162.099	N/A	162.517	0.779775	0.000028	00000011	



# TEC MAX Analysis Manager v1.0.26

## Single Exposure Residual Stress Report 8/10/2005 8:46:50 AM

**Description:** SBIR / AF Standard 8 / 0.15 from Edge / Hoop / jb  
(C:\SBIR DATA FROM MAX\SBIR - AF Standard 8 - 10Aug2005-08 51am.set)

STRESS RESULTS		
	KSI	MPa
<b>Residual Stress:</b>	-0.4917	-3.3904
<b>Counting Statistics Error (+/-):</b>	2.2516	15.5241

Fitted Delta D vs Sin^2(Psi)			
<b>D-Spacing Intercept:</b>	0.780271	<b>Slope of Fitted Line:</b>	-0.000052

MEASUREMENT PARAMETERS			
<b>Material Type [hkl]:</b>	Aluminum Alloy [333]	<b>Stress Constant:</b>	1.255E-7
<b>Depth:</b>	0.00	<b>Phi Angle:</b>	0.00
<b>Count Time:</b>	300.0 sec	<b>Collimator:</b>	5mm Collimator
<b>X-Ray Tube:</b>	Copper (Moxtek)	<b>X-Ray Wavelength:</b>	1.5406 Angs.
<b>Tube Voltage:</b>	26.0 KV	<b>Tube Current:</b>	80.000 uA
<b>Filter:</b>	Nickel	<b>Orientation:</b>	Omega

DETECTOR CALIBRATION PARAMETERS						
Detector	Active Channels		Calibration Parameters			
	Start	End	A	B	C	D
S/N 00000007	61	451	8.675221E-9	-6.629224E-6	1.703235E-2	-1.669914E2
S/N 00000011	61	451	1.123196E-8	-8.658852E-6	2.002985E-2	1.582417E2

SPECTRUM DATA													
Psi	Sin^2(psi)	Peak Chnl	Intensity	FWHM	Peak Gross	Peak Net	2-Theta	Ka Corr	Ka2 Peak	D Spacing	Std. Dev.	Det. S/N	Flags
24.5	0.18094	163.32	160.5	1.38	48665	48144	161.651	N/A	163.358	0.780261	0.000024	00000007	
41.5	0.45065	181.77	7.1	0.70	2167	2131	161.664	N/A	162.161	0.780247	0.000054	00000011	

# TEC MAX Analysis Manager v1.0.26

## Single Exposure Residual Stress Report 8/10/2005 2:48:43 PM

**Description:** SBIR / AF Standard 9 / 0.05 from Edge / Hoop / jb  
(C:\SBIR DATA FROM MAX\SBIR - AF Standard 9 - 10Aug2005-02 53pm.set)

STRESS RESULTS		
	KSI	MPa
<b>Residual Stress:</b>	-30.5887	-210.9011
<b>Counting Statistics Error (+/-):</b>	1.9442	13.4049

Fitted Delta D vs Sin^2(Psi)			
<b>D-Spacing Intercept:</b>	0.780917	<b>Slope of Fitted Line:</b>	-0.003240

MEASUREMENT PARAMETERS			
<b>Material Type [hkl]:</b>	Aluminum Alloy [333]	<b>Stress Constant:</b>	1.255E-7
<b>Depth:</b>	0.00	<b>Phi Angle:</b>	0.00
<b>Count Time:</b>	300.0 sec	<b>Collimator:</b>	5mm Collimator
<b>X-Ray Tube:</b>	Copper (Moxtek)	<b>X-Ray Wavelength:</b>	1.5406 Angs.
<b>Tube Voltage:</b>	26.0 KV	<b>Tube Current:</b>	80.000 uA
<b>Filter:</b>	Nickel	<b>Orientation:</b>	Omega

DETECTOR CALIBRATION PARAMETERS						
Detector	Active Channels		Calibration Parameters			
	Start	End	A	B	C	D
S/N 00000007	61	451	8.675221E-9	-6.629224E-6	1.703235E-2	-1.669914E2
S/N 00000011	61	451	1.123196E-8	-8.658852E-6	2.002985E-2	1.582417E2

SPECTRUM DATA													
Psi	Sin^2(psi)	Peak Chnl	Intensity	FWHM	Peak Gross	Peak Net	2-Theta	Ka Corr	Ka2 Peak	D Spacing	Std. Dev.	Det. S/N	Flags
24.5	0.18136	159.36	93.0	1.52	28192	27892	161.590	N/A	163.618	0.780329	0.000027	00000007	
41.5	0.44444	221.73	7.8	0.79	2367	2327	162.380	N/A	163.547	0.779477	0.000042	00000011	

# TEC MAX Analysis Manager v1.0.26

## Single Exposure Residual Stress Report 8/10/2005 1:55:48 PM

Description: SBIR / AF Standard 9 / 0.10 from Edge / Hoop / jb  
(C:\SBIR DATA FROM MAX\SBIR - AF Standard 9 - 10Aug2005-02 00pm.set)

STRESS RESULTS		
	KSI	MPa
Residual Stress:	-15.5929	-107.5094
Counting Statistics Error (+/-):	2.2302	15.3769

Fitted Delta D vs Sin^2(Psi)			
D-Spacing Intercept:	0.780313	Slope of Fitted Line:	-0.001625

MEASUREMENT PARAMETERS			
Material Type [hkl]:	Aluminum Alloy [333]	Stress Constant:	1.255E-7
Depth:	0.00	Phi Angle:	0.00
Count Time:	300.0 sec	Collimator:	5mm Collimator
X-Ray Tube:	Copper (Moxtek)	X-Ray Wavelength:	1.5406 Angs.
Tube Voltage:	26.0 KV	Tube Current:	80.000 uA
Filter:	Nickel	Orientation:	Omega

DETECTOR CALIBRATION PARAMETERS						
Detector	Active Channels		Calibration Parameters			
	Start	End	A	B	C	D
S/N 00000007	61	451	8.675221E-9	-6.629224E-6	1.703235E-2	-1.669914E2
S/N 00000011	61	451	1.123196E-8	-8.658852E-6	2.002985E-2	1.582417E2

SPECTRUM DATA													
Psi	Sin^2(psi)	Peak Chnl	Intensity	FWHM	Peak Gross	Peak Net	2-Theta	Ka Corr	Ka2 Peak	D Spacing	Std. Dev.	Det. S/N	Flags
24.5	0.17947	177.48	163.1	1.83	49429	48941	161.871	N/A	163.829	0.780021	0.000022	00000007	
41.5	0.44536	215.80	153.6	0.81	50549	46065	162.274	N/A	164.392	0.779589	0.000054	00000011	B

# TEC MAX Analysis Manager v1.0.26

## Single Exposure Residual Stress Report 8/10/2005 1:36:28 PM

Description: SBIR / AF Standard 9 / 0.15 from Edge / Hoop / jb  
(C:\SBIR DATA FROM MAX\SBIR - AF Standard 9 - 10Aug2005-01 41pm.set)

STRESS RESULTS		
	KSI	MPa
Residual Stress:	-25.4072	-175.1762
Counting Statistics Error (+/-):	1.7271	11.9079

Fitted Delta D vs Sin^2(Psi)			
D-Spacing Intercept:	0.780337	Slope of Fitted Line:	-0.002628

MEASUREMENT PARAMETERS			
Material Type [hkl]:	Aluminum Alloy [333]	Stress Constant:	1.255E-7
Depth:	0.00	Phi Angle:	0.00
Count Time:	300.0 sec	Collimator:	5mm Collimator
X-Ray Tube:	Copper (Moxtek)	X-Ray Wavelength:	1.5406 Angs.
Tube Voltage:	26.0 KV	Tube Current:	80.000 uA
Filter:	Nickel	Orientation:	Omega

DETECTOR CALIBRATION PARAMETERS						
Detector	Active Channels		Calibration Parameters			
	Start	End	A	B	C	D
S/N 00000007	61	451	8.675221E-9	-6.629224E-6	1.703235E-2	-1.669914E2
S/N 00000011	61	451	1.123196E-8	-8.658852E-6	2.002985E-2	1.582417E2

SPECTRUM DATA													
Psi	Sin^2(psi)	Peak Chnl	Intensity	FWHM	Peak Gross	Peak Net	2-Theta	Ka Corr	Ka2 Peak	D Spacing	Std. Dev.	Det. S/N	Flags
24.5	0.17852	186.63	164.5	2.06	50948	49360	162.013	N/A	163.942	0.779868	0.000030	00000007	
41.5	0.44194	237.90	0.4	0.35	870	122	162.668	N/A	163.376	0.779176	0.000033	00000011	

# TEC MAX Analysis Manager v1.0.26

## Single Exposure Residual Stress Report 8/11/2005 8:27:22 AM

**Description:** SBIR / AF Standard 10 / 0.05 from Edge / Hoop / jb  
(C:\SBIR DATA FROM MAX\SBIR - AF Standard 10 - 11Aug2005-08 32am.set)

STRESS RESULTS		
	KSI	MPa
<b>Residual Stress:</b>	-23.4728	-161.8392
<b>Counting Statistics Error (+/-):</b>	1.8390	12.6794

Fitted Delta D vs Sin^2(Psi)			
<b>D-Spacing Intercept:</b>	0.780777	<b>Slope of Fitted Line:</b>	-0.002485

MEASUREMENT PARAMETERS			
<b>Material Type [hkl]:</b>	Aluminum Alloy [333]	<b>Stress Constant:</b>	1.255E-7
<b>Depth:</b>	0.00	<b>Phi Angle:</b>	0.00
<b>Count Time:</b>	301.0 sec	<b>Collimator:</b>	5mm Collimator
<b>X-Ray Tube:</b>	Copper (Moxtek)	<b>X-Ray Wavelength:</b>	1.5406 Angs.
<b>Tube Voltage:</b>	26.0 KV	<b>Tube Current:</b>	80.000 uA
<b>Filter:</b>	Nickel	<b>Orientation:</b>	Omega

DETECTOR CALIBRATION PARAMETERS						
Detector	Active Channels		Calibration Parameters			
	Start	End	A	B	C	D
S/N 00000007	61	451	8.675221E-9	-6.629224E-6	1.703235E-2	-1.669914E2
S/N 00000011	61	451	1.123196E-8	-8.658852E-6	2.002985E-2	1.582417E2

SPECTRUM DATA													
Psi	Sin^2(psi)	Peak Chnl	Intensity	FWHM	Peak Gross	Peak Net	2-Theta	Ka Corr	Ka2 Peak	D Spacing	Std. Dev.	Det. S/N	Flags
24.5	0.18134	159.55	83.8	1.49	25525	25223	161.593	N/A	163.500	0.780326	0.000025	00000007	
41.5	0.44601	211.62	94.4	2.71	29959	28416	162.199	N/A	164.828	0.779668	0.000041	00000011	B

# TEC MAX Analysis Manager v1.0.26

## Single Exposure Residual Stress Report 8/11/2005 8:12:58 AM

**Description:** SBIR / AF Standard 10 / 0.10 from Edge / Hoop / jb  
(C:\SBIR DATA FROM MAX\SBIR - AF Standard 10 - 11Aug2005-08 17am.set)

STRESS RESULTS		
	KSI	MPa
<b>Residual Stress:</b>	-25.5900	-176.4364
<b>Counting Statistics Error (+/-):</b>	1.5700	10.8246

Fitted Delta D vs Sin^2(Psi)			
<b>D-Spacing Intercept:</b>	0.780930	<b>Slope of Fitted Line:</b>	-0.002724

MEASUREMENT PARAMETERS			
<b>Material Type [hkl]:</b>	Aluminum Alloy [333]	<b>Stress Constant:</b>	1.255E-7
<b>Depth:</b>	0.00	<b>Phi Angle:</b>	0.00
<b>Count Time:</b>	301.0 sec	<b>Collimator:</b>	5mm Collimator
<b>X-Ray Tube:</b>	Copper (Moxtek)	<b>X-Ray Wavelength:</b>	1.5406 Angs.
<b>Tube Voltage:</b>	26.0 KV	<b>Tube Current:</b>	80.000 uA
<b>Filter:</b>	Nickel	<b>Orientation:</b>	Omega

DETECTOR CALIBRATION PARAMETERS						
Detector	Active Channels		Calibration Parameters			
	Start	End	A	B	C	D
S/N 00000007	61	451	8.675221E-9	-6.629224E-6	1.703235E-2	-1.669914E2
S/N 00000011	61	451	1.123196E-8	-8.658852E-6	2.002985E-2	1.582417E2

SPECTRUM DATA													
Psi	Sin^2(psi)	Peak Chnl	Intensity	FWHM	Peak Gross	Peak Net	2-Theta	Ka Corr	Ka2 Peak	D Spacing	Std. Dev.	Det. S/N	Flags
24.5	0.18199	153.31	143.6	1.47	45918	43234	161.495	N/A	163.338	0.780434	0.000036	00000007	B
41.5	0.44638	209.25	167.0	0.75	50795	50253	162.157	N/A	163.810	0.779714	0.000019	00000011	B

# TEC MAX Analysis Manager v1.0.26

## Single Exposure Residual Stress Report 8/11/2005 7:58:22 AM

**Description:** SBIR / AF Standard 10 / 0.15 from Edge / Hoop / jb  
(C:\SBIR DATA FROM MAX\SBIR - AF Standard 10 - 11Aug2005-08 03am.set)

STRESS RESULTS		
	KSI	MPa
<b>Residual Stress:</b>	-39.5995	-273.0286
<b>Counting Statistics Error (+/-):</b>	1.5731	10.8461

Fitted Delta D vs Sin^2(Psi)			
<b>D-Spacing Intercept:</b>	0.781231	<b>Slope of Fitted Line:</b>	-0.004224

MEASUREMENT PARAMETERS			
<b>Material Type [hkl]:</b>	Aluminum Alloy [333]	<b>Stress Constant:</b>	1.255E-7
<b>Depth:</b>	0.00	<b>Phi Angle:</b>	0.00
<b>Count Time:</b>	301.0 sec	<b>Collimator:</b>	5mm Collimator
<b>X-Ray Tube:</b>	Copper (Moxtek)	<b>X-Ray Wavelength:</b>	1.5406 Angs.
<b>Tube Voltage:</b>	26.0 KV	<b>Tube Current:</b>	80.000 uA
<b>Filter:</b>	Nickel	<b>Orientation:</b>	Omega

DETECTOR CALIBRATION PARAMETERS						
Detector	Active Channels		Calibration Parameters			
	Start	End	A	B	C	D
S/N 00000007	61	451	8.675221E-9	-6.629224E-6	1.703235E-2	-1.669914E2
S/N 00000011	61	451	1.123196E-8	-8.658852E-6	2.002985E-2	1.582417E2

SPECTRUM DATA													
Psi	Sin^2(psi)	Peak Chnl	Intensity	FWHM	Peak Gross	Peak Net	2-Theta	Ka Corr	Ka2 Peak	D Spacing	Std. Dev.	Det. S/N	Flags
24.5	0.18216	151.70	139.2	1.48	44406	41900	161.470	N/A	163.159	0.780462	0.000036	00000007	B
41.5	0.44346	228.08	172.1	0.82	52298	51811	162.493	N/A	164.092	0.779358	0.000019	00000011	B

# TEC MAX Analysis Manager v1.0.26

## Single Exposure Residual Stress Report 8/11/2005 8:57:45 AM

**Description:** SBIR / AF Standard 11 / 0.05 from Edge / Hoop / jb  
(C:\SBIR DATA FROM MAX\SBIR - AF Standard 11 - 11Aug2005-09 02am.set)

STRESS RESULTS		
	KSI	MPa
<b>Residual Stress:</b>	-31.7644	-219.0077
<b>Counting Statistics Error (+/-):</b>	2.0837	14.3669

Fitted Delta D vs Sin^2(Psi)			
<b>D-Spacing Intercept:</b>	0.780841	<b>Slope of Fitted Line:</b>	-0.003349

MEASUREMENT PARAMETERS			
<b>Material Type [hkl]:</b>	Aluminum Alloy [333]	<b>Stress Constant:</b>	1.255E-7
<b>Depth:</b>	0.00	<b>Phi Angle:</b>	0.00
<b>Count Time:</b>	301.0 sec	<b>Collimator:</b>	5mm Collimator
<b>X-Ray Tube:</b>	Copper (Moxtek)	<b>X-Ray Wavelength:</b>	1.5406 Angs.
<b>Tube Voltage:</b>	26.0 KV	<b>Tube Current:</b>	80.000 uA
<b>Filter:</b>	Nickel	<b>Orientation:</b>	Omega

DETECTOR CALIBRATION PARAMETERS						
Detector	Active Channels		Calibration Parameters			
	Start	End	A	B	C	D
S/N 00000007	61	451	8.675221E-9	-6.629224E-6	1.703235E-2	-1.669914E2
S/N 00000011	61	451	1.123196E-8	-8.658852E-6	2.002985E-2	1.582417E2

SPECTRUM DATA													
Psi	Sin^2(psi)	Peak Chnl	Intensity	FWHM	Peak Gross	Peak Net	2-Theta	Ka Corr	Ka2 Peak	D Spacing	Std. Dev.	Det. S/N	Flags
24.5	0.18079	164.84	55.6	1.87	17310	16743	161.675	N/A	163.793	0.780235	0.000047	00000007	B
41.5	0.44344	228.19	115.8	2.71	35104	34844	162.495	N/A	164.845	0.779356	0.000025	00000011	B



# TEC MAX Analysis Manager v1.0.26

## Single Exposure Residual Stress Report 8/11/2005 8:37:31 AM

**Description:** SBIR / AF Standard 11 / 0.15 from Edge / Hoop / jb  
(C:\SBIR DATA FROM MAX\SBIR - AF Standard 11 - 11Aug2005-08 42am.set)

STRESS RESULTS		
	KSI	MPa
Residual Stress:	-6.1851	-42.6447
Counting Statistics Error (+/-):	1.6345	11.2694

Fitted Delta D vs Sin^2(Psi)			
D-Spacing Intercept:	0.779753	Slope of Fitted Line:	-0.000632

MEASUREMENT PARAMETERS			
Material Type [hkl]:	Aluminum Alloy [333]	Stress Constant:	1.255E-7
Depth:	0.00	Phi Angle:	0.00
Count Time:	301.0 sec	Collimator:	5mm Collimator
X-Ray Tube:	Copper (Moxtek)	X-Ray Wavelength:	1.5406 Angs.
Tube Voltage:	26.0 KV	Tube Current:	80.000 uA
Filter:	Nickel	Orientation:	Omega

DETECTOR CALIBRATION PARAMETERS						
Detector	Active Channels		Calibration Parameters			
	Start	End	A	B	C	D
S/N 00000007	61	451	8.675221E-9	-6.629224E-6	1.703235E-2	-1.669914E2
S/N 00000011	61	451	1.123196E-8	-8.658852E-6	2.002985E-2	1.582417E2

SPECTRUM DATA													
Psi	Sin^2(psi)	Peak Chnl	Intensity	FWHM	Peak Gross	Peak Net	2-Theta	Ka Corr	Ka2 Peak	D Spacing	Std. Dev.	Det. S/N	Flags
24.5	0.17710	200.37	150.1	2.16	45529	45194	162.225	N/A	164.220	0.779641	0.000022	00000007	B
41.5	0.44440	222.01	162.2	2.39	50401	48821	162.385	N/A	164.257	0.779472	0.000036	00000011	B

# TEC MAX Analysis Manager v1.0.26

## Single Exposure Residual Stress Report 8/11/2005 12:02:33 PM

**Description:** sBIR / AF Standard 12 / 0.05 from Edge / Hoop / jb  
(C:\SBIR DATA FROM MAX\sBIR - AF Standard 12 - 11Aug2005-12 07pm.set)

STRESS RESULTS		
	KSI	MPa
<b>Residual Stress:</b>	-21.8835	-150.8811
<b>Counting Statistics Error (+/-):</b>	1.4821	10.2187

Fitted Delta D vs Sin^2(Psi)			
<b>D-Spacing Intercept:</b>	0.780711	<b>Slope of Fitted Line:</b>	-0.002313

MEASUREMENT PARAMETERS			
<b>Material Type [hkl]:</b>	Aluminum Alloy [333]	<b>Stress Constant:</b>	1.255E-7
<b>Depth:</b>	0.00	<b>Phi Angle:</b>	0.00
<b>Count Time:</b>	301.0 sec	<b>Collimator:</b>	5mm Collimator
<b>X-Ray Tube:</b>	Copper (Moxtek)	<b>X-Ray Wavelength:</b>	1.5406 Angs.
<b>Tube Voltage:</b>	26.0 KV	<b>Tube Current:</b>	80.000 uA
<b>Filter:</b>	Nickel	<b>Orientation:</b>	Omega

DETECTOR CALIBRATION PARAMETERS						
Detector	Active Channels		Calibration Parameters			
	Start	End	A	B	C	D
S/N 00000007	61	451	8.675221E-9	-6.629224E-6	1.703235E-2	-1.669914E2
S/N 00000011	61	451	1.123196E-8	-8.658852E-6	2.002985E-2	1.582417E2

SPECTRUM DATA													
Psi	Sin^2(psi)	Peak Chnl	Intensity	FWHM	Peak Gross	Peak Net	2-Theta	Ka Corr	Ka2 Peak	D Spacing	Std. Dev.	Det. S/N	Flags
24.5	0.18113	161.54	99.0	1.49	30243	29799	161.624	N/A	163.143	0.780292	0.000026	00000007	B
41.5	0.44610	211.06	93.2	0.80	28279	28061	162.189	N/A	164.338	0.779679	0.000028	00000011	B

# TEC MAX Analysis Manager v1.0.26

## Single Exposure Residual Stress Report 8/11/2005 9:42:18 AM

Description: SBIR / AF Standard 12 / 0.10 from Edge / Hoop / jb  
(C:\SBIR DATA FROM MAX\SBIR - AF Standard 12 - 11Aug2005-09 47am.set)

STRESS RESULTS		
	KSI	MPa
Residual Stress:	-18.1930	-125.4361
Counting Statistics Error (+/-):	1.9312	13.3153

Fitted Delta D vs Sin^2(Psi)			
D-Spacing Intercept:	0.780489	Slope of Fitted Line:	-0.001908

MEASUREMENT PARAMETERS			
Material Type [hkl]:	Aluminum Alloy [333]	Stress Constant:	1.255E-7
Depth:	0.00	Phi Angle:	0.00
Count Time:	301.0 sec	Collimator:	5mm Collimator
X-Ray Tube:	Copper (Moxtek)	X-Ray Wavelength:	1.5406 Angs.
Tube Voltage:	26.0 KV	Tube Current:	80.000 uA
Filter:	Nickel	Orientation:	Omega

DETECTOR CALIBRATION PARAMETERS						
Detector	Active Channels		Calibration Parameters			
	Start	End	A	B	C	D
S/N 00000007	61	451	8.675221E-9	-6.629224E-6	1.703235E-2	-1.669914E2
S/N 00000011	61	451	1.123196E-8	-8.658852E-6	2.002985E-2	1.582417E2

SPECTRUM DATA													
Psi	Sin^2(psi)	Peak Chnl	Intensity	FWHM	Peak Gross	Peak Net	2-Theta	Ka Corr	Ka2 Peak	D Spacing	Std. Dev.	Det. S/N	Flags
24.5	0.18023	170.13	165.1	0.53	53256	49682	161.757	N/A	164.358	0.780145	0.000025	00000007	B
41.5	0.44577	213.19	115.3	2.28	35750	34708	162.227	N/A	164.587	0.779638	0.000043	00000011	B

# TEC MAX Analysis Manager v1.0.26

## Single Exposure Residual Stress Report 8/11/2005 12:15:30 PM

**Description:** SBIR / AF Standard 13 / 0.15 from Edge / Hoop / jb  
(C:\SBIR DATA FROM MAX\SBIR - AF Standard 13 - 11Aug2005-12 20pm.set)

STRESS RESULTS		
	KSI	MPa
<b>Residual Stress:</b>	-2.6803	-18.4799
<b>Counting Statistics Error (+/-):</b>	1.0807	7.4512

Fitted Delta D vs Sin^2(Psi)			
<b>D-Spacing Intercept:</b>	0.779868	<b>Slope of Fitted Line:</b>	-0.000276

MEASUREMENT PARAMETERS			
<b>Material Type [hkl]:</b>	Aluminum Alloy [333]	<b>Stress Constant:</b>	1.255E-7
<b>Depth:</b>	0.00	<b>Phi Angle:</b>	0.00
<b>Count Time:</b>	301.0 sec	<b>Collimator:</b>	5mm Collimator
<b>X-Ray Tube:</b>	Copper (Moxtek)	<b>X-Ray Wavelength:</b>	1.5406 Angs.
<b>Tube Voltage:</b>	26.0 KV	<b>Tube Current:</b>	80.000 uA
<b>Filter:</b>	Nickel	<b>Orientation:</b>	Omega

DETECTOR CALIBRATION PARAMETERS						
Detector	Active Channels		Calibration Parameters			
	Start	End	A	B	C	D
S/N 00000007	61	451	8.675221E-9	-6.629224E-6	1.703235E-2	-1.669914E2
S/N 00000011	61	451	1.123196E-8	-8.658852E-6	2.002985E-2	1.582417E2

SPECTRUM DATA													
Psi	Sin^2(psi)	Peak Chnl	Intensity	FWHM	Peak Gross	Peak Net	2-Theta	Ka Corr	Ka2 Peak	D Spacing	Std. Dev.	Det. S/N	Flags
24.5	0.17809	190.80	190.3	1.96	58786	57292	162.077	N/A	164.025	0.779819	0.000021	00000007	BM
41.5	0.44646	208.68	172.5	2.46	52249	51937	162.146	N/A	164.468	0.779745	0.000019	00000011	BM

# TEC MAX Analysis Manager v1.0.26

## Single Exposure Residual Stress Report

8/12/2005 8:10:08 AM

Description: SBIR / AF Standard 14 / 0.05 from Edge / Hoop / jb  
(C:\SBIR DATA FROM MAX\SBIR - AF Standard 14 - 12Aug2005-08 15am.set)

STRESS RESULTS		
	KSI	MPa
Residual Stress:	-32.1290	-221.5211
Counting Statistics Error (+/-):	2.6156	18.0338

Fitted Delta D vs Sin^2(Psi)			
D-Spacing Intercept:	0.780949	Slope of Fitted Line:	-0.003404

MEASUREMENT PARAMETERS			
Material Type [hkl]:	Aluminum Alloy [333]	Stress Constant:	1.255E-7
Depth:	0.00	Phi Angle:	0.00
Count Time:	300.0 sec	Collimator:	5mm Collimator
X-Ray Tube:	Copper (Moxtek)	X-Ray Wavelength:	1.5406 Angs.
Tube Voltage:	26.0 KV	Tube Current:	80.000 uA
Filter:	Nickel	Orientation:	Omega

DETECTOR CALIBRATION PARAMETERS						
Detector	Active Channels		Calibration Parameters			
	Start	End	A	B	C	D
S/N 00000007	61	451	8.675221E-9	-6.629224E-6	1.703235E-2	-1.669914E2
S/N 00000011	61	451	1.123196E-8	-8.658852E-6	2.002985E-2	1.582417E2

SPECTRUM DATA													
Psi	Sin^2(psi)	Peak Chnl	Intensity	FWHM	Peak Gross	Peak Net	2-Theta	Ka Corr	Ka2 Peak	D Spacing	Std. Dev.	Det. S/N	Flags
24.5	0.18137	159.21	144.0	1.78	45554	43212	161.587	N/A	163.711	0.780332	0.000030	00000007	B
41.5	0.44412	223.83	90.1	2.08	28561	27028	162.417	N/A	164.369	0.779438	0.000060	00000011	B

# TEC MAX Analysis Manager v1.0.26

## Single Exposure Residual Stress Report 8/12/2005 8:00:57 AM

**Description:** SBIR / AF Standard 14 / 0.10 from Edge / Hoop / jb  
(C:\SBIR DATA FROM MAX\SBIR - AF Standard 14 - 12Aug2005-08 05am.set)

STRESS RESULTS		
	KSI	MPa
<b>Residual Stress:</b>	-22.9687	-158.3630
<b>Counting Statistics Error (+/-):</b>	2.2187	15.2974

Fitted Delta D vs Sin^2(Psi)			
<b>D-Spacing Intercept:</b>	0.780521	<b>Slope of Fitted Line:</b>	-0.002403

MEASUREMENT PARAMETERS			
<b>Material Type [hkl]:</b>	Aluminum Alloy [333]	<b>Stress Constant:</b>	1.255E-7
<b>Depth:</b>	0.00	<b>Phi Angle:</b>	0.00
<b>Count Time:</b>	301.0 sec	<b>Collimator:</b>	5mm Collimator
<b>X-Ray Tube:</b>	Copper (Moxtek)	<b>X-Ray Wavelength:</b>	1.5406 Angs.
<b>Tube Voltage:</b>	26.0 KV	<b>Tube Current:</b>	80.000 uA
<b>Filter:</b>	Nickel	<b>Orientation:</b>	Omega

DETECTOR CALIBRATION PARAMETERS						
Active Channels			Calibration Parameters			
Detector	Start	End	A	B	C	D
S/N 00000007	61	451	8.675221E-9	-6.629224E-6	1.703235E-2	-1.669914E2
S/N 00000011	61	451	1.123196E-8	-8.658852E-6	2.002985E-2	1.582417E2

SPECTRUM DATA													
Psi	Sin^2(psi)	Peak Chnl	Intensity	FWHM	Peak Gross	Peak Net	2-Theta	Ka Corr	Ka2 Peak	D Spacing	Std. Dev.	Det. S/N	Flags
24.5	0.17988	173.49	152.2	1.68	46490	45813	161.809	N/A	163.514	0.780088	0.000023	00000007	B
41.5	0.44425	223.00	136.7	1.91	44129	41143	162.402	N/A	164.112	0.779453	0.000053	00000011	B

# TEC MAX Analysis Manager v1.0.26

## Single Exposure Residual Stress Report

8/12/2005 7:45:48 AM

**Description:** SBIR / AF Standard 14 / 0.15 from Edge / Hoop / jb  
(C:\SBIR DATA FROM MAX\SBIR - AF Standard 14 - 12Aug2005-07 50am.set)

STRESS RESULTS		
	KSI	MPa
<b>Residual Stress:</b>	-20.6591	-142.4395
<b>Counting Statistics Error (+/-):</b>	1.4880	10.2591

Fitted Delta D vs Sin^2(Psi)			
<b>D-Spacing Intercept:</b>	0.780506	<b>Slope of Fitted Line:</b>	-0.002164

MEASUREMENT PARAMETERS			
<b>Material Type [hkl]:</b>	Aluminum Alloy [333]	<b>Stress Constant:</b>	1.255E-7
<b>Depth:</b>	0.00	<b>Phi Angle:</b>	0.00
<b>Count Time:</b>	301.0 sec	<b>Collimator:</b>	5mm Collimator
<b>X-Ray Tube:</b>	Copper (Moxtek)	<b>X-Ray Wavelength:</b>	1.5406 Angs.
<b>Tube Voltage:</b>	26.0 KV	<b>Tube Current:</b>	80.000 uA
<b>Filter:</b>	Nickel	<b>Orientation:</b>	Omega

DETECTOR CALIBRATION PARAMETERS						
Active Channels			Calibration Parameters			
Detector	Start	End	A	B	C	D
S/N 00000007	61	451	8.675221E-9	-6.629224E-6	1.703235E-2	-1.669914E2
S/N 00000011	61	451	1.123196E-8	-8.658852E-6	2.002985E-2	1.582417E2

SPECTRUM DATA													
Psi	Sin^2(psi)	Peak Chnl	Intensity	FWHM	Peak Gross	Peak Net	2-Theta	Ka Corr	Ka2 Peak	D Spacing	Std. Dev.	Det. S/N	Flags
24.5	0.18006	171.83	164.0	2.05	54191	49352	161.783	N/A	163.750	0.780117	0.000029	00000007	B
41.5	0.44499	218.22	173.0	2.78	54258	52084	162.317	N/A	164.772	0.779543	0.000026	00000011	B

# TEC MAX Analysis Manager v1.0.26

## Single Exposure Residual Stress Report 8/12/2005 8:18:06 AM

Description: SBIR / AF Standard 15 / 0.15 from Edge / Hoop / jb  
(C:\SBIR DATA FROM MAX\SBIR - AF Standard 15 - 12Aug2005-08 23am.set)

STRESS RESULTS		
	KSI	MPa
Residual Stress:	3.6156	24.9285
Counting Statistics Error (+/-):	2.0901	14.4107

Fitted Delta D vs Sin^2(Psi)			
D-Spacing Intercept:	0.780051	Slope of Fitted Line:	0.000378

MEASUREMENT PARAMETERS			
Material Type [hkl]:	Aluminum Alloy [333]	Stress Constant:	1.255E-7
Depth:	0.00	Phi Angle:	0.00
Count Time:	301.0 sec	Collimator:	5mm Collimator
X-Ray Tube:	Copper (Moxtek)	X-Ray Wavelength:	1.5406 Angs.
Tube Voltage:	26.0 KV	Tube Current:	80.000 uA
Filter:	Nickel	Orientation:	Omega

DETECTOR CALIBRATION PARAMETERS						
Detector	Active Channels		Calibration Parameters			
	Start	End	A	B	C	D
S/N 00000007	61	451	8.675221E-9	-6.629224E-6	1.703235E-2	-1.669914E2
S/N 00000011	61	451	1.123196E-8	-8.658852E-6	2.002985E-2	1.582417E2

SPECTRUM DATA													
Psi	Sin^2(psi)	Peak Chnl	Intensity	FWHM	Peak Gross	Peak Net	2-Theta	Ka Corr	Ka2 Peak	D Spacing	Std. Dev.	Det. S/N	Flags
24.5	0.18007	171.67	138.1	2.08	45214	41562	161.781	N/A	163.842	0.780119	0.000030	00000007	B
41.5	0.45045	183.09	139.5	1.87	46017	41988	161.688	N/A	163.677	0.780221	0.000046	00000011	B



# TEC MAX Analysis Manager v1.0.26

## Single Exposure Residual Stress Report 8/12/2005 9:18:34 AM

**Description:** SBIR / AF Standard 16 / 0.05 from Edge / Hoop / jb  
(C:\SBIR DATA FROM MAX\SBIR - AF Standard 16 - 12Aug2005-09 23am.set)

STRESS RESULTS		
	KSI	MPa
<b>Residual Stress:</b>	-31.1878	-215.0321
<b>Counting Statistics Error (+/-):</b>	1.6094	11.0965

Fitted Delta D vs Sin^2(Psi)			
<b>D-Spacing Intercept:</b>	0.781114	<b>Slope of Fitted Line:</b>	-0.003333

MEASUREMENT PARAMETERS			
<b>Material Type [hkl]:</b>	Aluminum Alloy [333]	<b>Stress Constant:</b>	1.255E-7
<b>Depth:</b>	0.00	<b>Phi Angle:</b>	0.00
<b>Count Time:</b>	301.0 sec	<b>Collimator:</b>	5mm Collimator
<b>X-Ray Tube:</b>	Copper (Moxtek)	<b>X-Ray Wavelength:</b>	1.5406 Angs.
<b>Tube Voltage:</b>	26.0 KV	<b>Tube Current:</b>	80.000 uA
<b>Filter:</b>	Nickel	<b>Orientation:</b>	Omega

DETECTOR CALIBRATION PARAMETERS						
Detector	Active Channels		Calibration Parameters			
	Start	End	A	B	C	D
S/N 00000007	61	451	8.675221E-9	-6.629224E-6	1.703235E-2	-1.669914E2
S/N 00000011	61	451	1.123196E-8	-8.658852E-6	2.002985E-2	1.582417E2

SPECTRUM DATA													
Psi	Sin^2(psi)	Peak Chnl	Intensity	FWHM	Peak Gross	Peak Net	2-Theta	Ka Corr	Ka2 Peak	D Spacing	Std. Dev.	Det. S/N	Flags
24.5	0.18243	149.12	115.2	1.51	36394	34673	161.430	N/A	163.454	0.780506	0.000031	00000007	B
41.5	0.44569	213.69	125.0	2.22	38038	37629	162.236	N/A	164.456	0.779629	0.000027	00000011	B

# TEC MAX Analysis Manager v1.0.26

## Single Exposure Residual Stress Report

8/12/2005 9:06:29 AM

Description: SBIR / AF Standard 16 / 0.10 from Edge / Hoop / jb  
(C:\SBIR DATA FROM MAX\SBIR - AF Standard 16 - 12Aug2005-09 11am.set)

STRESS RESULTS		
	KSI	MPa
Residual Stress:	-31.6600	-218.2877
Counting Statistics Error (+/-):	1.1303	7.7931

Fitted Delta D vs Sin^2(Psi)			
D-Spacing Intercept:	0.780984	Slope of Fitted Line:	-0.003361

MEASUREMENT PARAMETERS			
Material Type [hkl]:	Aluminum Alloy [333]	Stress Constant:	1.255E-7
Depth:	0.00	Phi Angle:	0.00
Count Time:	301.0 sec	Collimator:	5mm Collimator
X-Ray Tube:	Copper (Moxtek)	X-Ray Wavelength:	1.5406 Angs.
Tube Voltage:	26.0 KV	Tube Current:	80.000 uA
Filter:	Nickel	Orientation:	Omega

DETECTOR CALIBRATION PARAMETERS						
Detector	Active Channels		Calibration Parameters			
	Start	End	A	B	C	D
S/N 00000007	61	451	8.675221E-9	-6.629224E-6	1.703235E-2	-1.669914E2
S/N 00000011	61	451	1.123196E-8	-8.658852E-6	2.002985E-2	1.582417E2

SPECTRUM DATA													
Psi	Sin^2(psi)	Peak Chnl	Intensity	FWHM	Peak Gross	Peak Net	2-Theta	Ka Corr	Ka2 Peak	D Spacing	Std. Dev.	Det. S/N	Flags
24.5	0.18163	156.81	157.9	1.60	48061	47538	161.550	N/A	163.642	0.780373	0.000020	00000007	B
41.5	0.44455	221.06	168.1	2.75	50935	50602	162.368	N/A	164.809	0.779490	0.000021	00000011	B

# TEC MAX Analysis Manager v1.0.26

## Single Exposure Residual Stress Report

8/12/2005 8:49:26 AM

Description: SBIR / AF Standard 16 / 0.15 from Edge / Hoop / jb  
(C:\SBIR DATA FROM MAX\SBIR - AF Standard 16 - 12Aug2005-08 54am.set)

STRESS RESULTS		
	KSI	MPa
Residual Stress:	-12.4044	-85.5252
Counting Statistics Error (+/-):	1.9421	13.3904

Fitted Delta D vs Sin^2(Psi)			
D-Spacing Intercept:	0.780367	Slope of Fitted Line:	-0.001300

MEASUREMENT PARAMETERS			
Material Type [hkl]:	Aluminum Alloy [333]	Stress Constant:	1.255E-7
Depth:	0.00	Phi Angle:	0.00
Count Time:	301.0 sec	Collimator:	5mm Collimator
X-Ray Tube:	Copper (Moxtek)	X-Ray Wavelength:	1.5406 Angs.
Tube Voltage:	26.0 KV	Tube Current:	80.000 uA
Filter:	Nickel	Orientation:	Omega

DETECTOR CALIBRATION PARAMETERS						
Detector	Active Channels		Calibration Parameters			
	Start	End	A	B	C	D
S/N 00000007	61	451	8.675221E-9	-6.629224E-6	1.703235E-2	-1.669914E2
S/N 00000011	61	451	1.123196E-8	-8.658852E-6	2.002985E-2	1.582417E2

SPECTRUM DATA													
Psi	Sin^2(psi)	Peak Chnl	Intensity	FWHM	Peak Gross	Peak Net	2-Theta	Ka Corr	Ka2 Peak	D Spacing	Std. Dev.	Det. S/N	Flags
24.5	0.18015	170.89	165.6	1.84	50374	49845	161.769	N/A	163.970	0.780132	0.000024	00000007	B
41.5	0.44696	205.49	175.6	2.68	60528	52869	162.089	N/A	164.236	0.779786	0.000045	00000011	B

# TEC MAX Analysis Manager v1.0.26

## Single Exposure Residual Stress Report 8/12/2005 11:29:55 AM

Description: SBIR / AF Standard 17 / 0.05 from Edge / Hoop / jb  
(E:\SBIR - AF Standard 17 - 12Aug2005-11 34am.set)

STRESS RESULTS		
	KSI	MPa
Residual Stress:	-38.9754	-268.7253
Counting Statistics Error (+/-):	1.3417	9.2506

Fitted Delta D vs Sin^2(Psi)			
D-Spacing Intercept:	0.781160	Slope of Fitted Line:	-0.004146

MEASUREMENT PARAMETERS			
Material Type [hkl]:	Aluminum Alloy [333]	Stress Constant:	1.255E-7
Depth:	0.00	Phi Angle:	0.00
Count Time:	300.0 sec	Collimator:	5mm Collimator
X-Ray Tube:	Copper (Moxtek)	X-Ray Wavelength:	1.5406 Angs.
Tube Voltage:	26.0 KV	Tube Current:	80.000 uA
Filter:	Nickel	Orientation:	Omega

DETECTOR CALIBRATION PARAMETERS						
Detector	Active Channels		Calibration Parameters			
	Start	End	A	B	C	D
S/N 00000007	61	451	8.675221E-9	-6.629224E-6	1.703235E-2	-1.669914E2
S/N 00000011	61	451	1.123196E-8	-8.658852E-6	2.002985E-2	1.582417E2

SPECTRUM DATA													
Psi	Sin^2(psi)	Peak Chnl	Intensity	FWHM	Peak Gross	Peak Net	2-Theta	Ka Corr	Ka2 Peak	D Spacing	Std. Dev.	Det. S/N	Flags
24.5	0.18183	154.90	94.8	1.36	28685	28453	161.520	N/A	163.309	0.780406	0.000025	00000007	B
41.5	0.44317	229.97	110.8	1.99	33469	33252	162.527	N/A	163.962	0.779323	0.000024	00000011	B

# TEC MAX Analysis Manager v1.0.26

## Single Exposure Residual Stress Report 8/12/2005 11:05:45 AM

Description: SBIR / AF Standard 17 / 0.10 from Edge / Hoop / jb  
(E:\SBIR - AF Standard 17 - 12Aug2005-11 10am.set)

STRESS RESULTS		
	KSI	MPa
Residual Stress:	-6.9073	-47.6238
Counting Statistics Error (+/-):	1.9045	13.1308

Fitted Delta D vs Sin^2(Psi)			
D-Spacing Intercept:	0.780487	Slope of Fitted Line:	-0.000732

MEASUREMENT PARAMETERS			
Material Type [hkl]:	Aluminum Alloy [333]	Stress Constant:	1.255E-7
Depth:	0.00	Phi Angle:	0.00
Count Time:	301.0 sec	Collimator:	5mm Collimator
X-Ray Tube:	Copper (Moxtek)	X-Ray Wavelength:	1.5406 Angs.
Tube Voltage:	26.0 KV	Tube Current:	80.000 uA
Filter:	Nickel	Orientation:	Omega

DETECTOR CALIBRATION PARAMETERS						
Detector	Active Channels		Calibration Parameters			
	Start	End	A	B	C	D
S/N 00000007	61	451	8.675221E-9	-6.629224E-6	1.703235E-2	-1.669914E2
S/N 00000011	61	451	1.123196E-8	-8.658852E-6	2.002985E-2	1.582417E2

SPECTRUM DATA													
Psi	Sin^2(psi)	Peak Chnl	Intensity	FWHM	Peak Gross	Peak Net	2-Theta	Ka Corr	Ka2 Peak	D Spacing	Std. Dev.	Det. S/N	Flags
24.5	0.18151	157.94	137.0	1.66	41919	41229	161.567	N/A	163.584	0.780354	0.000024	00000007	B
41.5	0.44994	186.34	145.2	0.79	48791	43711	161.746	N/A	163.561	0.780157	0.000044	00000011	B

# TEC MAX Analysis Manager v1.0.26

## Single Exposure Residual Stress Report 8/12/2005 10:32:20 AM

Description: SBIR / AF Standard 17 / 0.15 from Edge / Hoop / jb  
(E:\SBIR - AF Standard 17 - 12Aug2005-10 37am.set)

STRESS RESULTS		
	KSI	MPa
Residual Stress:	6.7420	46.4843
Counting Statistics Error (+/-):	1.1976	8.2569

Fitted Delta D vs Sin^2(Psi)			
D-Spacing Intercept:	0.779828	Slope of Fitted Line:	0.000700

MEASUREMENT PARAMETERS			
Material Type [hkl]:	Aluminum Alloy [333]	Stress Constant:	1.255E-7
Depth:	0.00	Phi Angle:	0.00
Count Time:	301.0 sec	Collimator:	5mm Collimator
X-Ray Tube:	Copper (Moxtek)	X-Ray Wavelength:	1.5406 Angs.
Tube Voltage:	26.0 KV	Tube Current:	80.000 uA
Filter:	Nickel	Orientation:	Omega

DETECTOR CALIBRATION PARAMETERS						
Detector	Active Channels		Calibration Parameters			
	Start	End	A	B	C	D
S/N 00000007	61	451	8.675221E-9	-6.629224E-6	1.703235E-2	-1.669914E2
S/N 00000011	61	451	1.123196E-8	-8.658852E-6	2.002985E-2	1.582417E2

SPECTRUM DATA													
Psi	Sin^2(psi)	Peak Chnl	Intensity	FWHM	Peak Gross	Peak Net	2-Theta	Ka Corr	Ka2 Peak	D Spacing	Std. Dev.	Det. S/N	Flags
24.5	0.17905	181.54	160.4	2.09	50828	48288	161.934	N/A	163.770	0.779953	0.000024	00000007	B
41.5	0.44982	187.10	176.4	1.67	53529	53110	161.760	N/A	164.012	0.780142	0.000020	00000011	B

# TEC MAX Analysis Manager v1.0.26

## Single Exposure Residual Stress Report 8/12/2005 12:30:53 PM

Description: SBIR / AF Standard 18 / 0.05 from Edge / Hoop / jb  
(E:\SBIR - AF Standard 18 - 12Aug2005-12 35pm.set)

STRESS RESULTS		
	KSI	MPa
Residual Stress:	-43.9465	-303.0001
Counting Statistics Error (+/-):	4.4074	30.3876

Fitted Delta D vs Sin^2(Psi)			
D-Spacing Intercept:	0.781169	Slope of Fitted Line:	-0.004657

MEASUREMENT PARAMETERS			
Material Type [hkl]:	Aluminum Alloy [333]	Stress Constant:	1.255E-7
Depth:	0.00	Phi Angle:	0.00
Count Time:	300.0 sec	Collimator:	5mm Collimator
X-Ray Tube:	Copper (Moxtek)	X-Ray Wavelength:	1.5406 Angs.
Tube Voltage:	26.0 KV	Tube Current:	80.000 uA
Filter:	Nickel	Orientation:	Omega

DETECTOR CALIBRATION PARAMETERS						
Detector	Active Channels		Calibration Parameters			
	Start	End	A	B	C	D
S/N 00000007	61	451	8.675221E-9	-6.629224E-6	1.703235E-2	-1.669914E2
S/N 00000011	61	451	1.123196E-8	-8.658852E-6	2.002985E-2	1.582417E2

SPECTRUM DATA													
Psi	Sin^2(psi)	Peak Chnl	Intensity	FWHM	Peak Gross	Peak Net	2-Theta	Ka Corr	Ka2 Peak	D Spacing	Std. Dev.	Det. S/N	Flags
24.5	0.18133	159.65	90.5	1.38	39354	27138	161.594	N/A	163.927	0.780324	0.000061	00000007	B
41.5	0.44142	241.29	100.1	3.56	35298	30023	162.728	N/A	165.543	0.779113	0.000094	00000011	B

# TEC MAX Analysis Manager v1.0.26

## Single Exposure Residual Stress Report 8/12/2005 11:38:16 AM

**Description:** SBIR / AF Standard 18 / 0.15 from Edge / Hoop / jb  
(E:\SBIR - AF Standard 18 - 12Aug2005-11 43am.set)

STRESS RESULTS		
	KSI	MPa
<b>Residual Stress:</b>	-5.9861	-41.2724
<b>Counting Statistics Error (+/-):</b>	1.6278	11.2233

Fitted Delta D vs Sin^2(Psi)			
<b>D-Spacing Intercept:</b>	0.780191	<b>Slope of Fitted Line:</b>	-0.000626

MEASUREMENT PARAMETERS			
<b>Material Type [hkl]:</b>	Aluminum Alloy [333]	<b>Stress Constant:</b>	1.255E-7
<b>Depth:</b>	0.00	<b>Phi Angle:</b>	0.00
<b>Count Time:</b>	301.0 sec	<b>Collimator:</b>	5mm Collimator
<b>X-Ray Tube:</b>	Copper (Moxtek)	<b>X-Ray Wavelength:</b>	1.5406 Angs.
<b>Tube Voltage:</b>	26.0 KV	<b>Tube Current:</b>	80.000 uA
<b>Filter:</b>	Nickel	<b>Orientation:</b>	Omega

DETECTOR CALIBRATION PARAMETERS						
Detector	Active Channels		Calibration Parameters			
	Start	End	A	B	C	D
S/N 00000007	61	451	8.675221E-9	-6.629224E-6	1.703235E-2	-1.669914E2
S/N 00000011	61	451	1.123196E-8	-8.658852E-6	2.002985E-2	1.582417E2

SPECTRUM DATA													
Psi	Sin^2(psi)	Peak Chnl	Intensity	FWHM	Peak Gross	Peak Net	2-Theta	Ka Corr	Ka2 Peak	D Spacing	Std. Dev.	Det. S/N	Flags
24.5	0.17982	174.08	177.6	1.96	57023	53464	161.818	N/A	163.845	0.780078	0.000032	00000007	B
41.5	0.44797	198.99	150.3	2.43	46018	45250	161.973	N/A	164.450	0.779911	0.000028	00000011	B



# TEC MAX Analysis Manager v1.0.26

## Single Exposure Residual Stress Report 8/12/2005 4:11:02 PM

Description: SBIR / AF Standard 19 / 0.05 from Edge / Hoop / jb  
(E:\SBIR - AF Standard 19 - 12Aug2005-04 16pm.set)

STRESS RESULTS		
	KSI	MPa
Residual Stress:	-26.4353	-182.2649
Counting Statistics Error (+/-):	2.4272	16.7349

Fitted Delta D vs Sin^2(Psi)			
D-Spacing Intercept:	0.780920	Slope of Fitted Line:	-0.002811

MEASUREMENT PARAMETERS			
Material Type [hkl]:	Aluminum Alloy [333]	Stress Constant:	1.255E-7
Depth:	0.00	Phi Angle:	0.00
Count Time:	300.0 sec	Collimator:	5mm Collimator
X-Ray Tube:	Copper (Moxtek)	X-Ray Wavelength:	1.5406 Angs.
Tube Voltage:	26.0 KV	Tube Current:	80.000 uA
Filter:	Nickel	Orientation:	Omega

DETECTOR CALIBRATION PARAMETERS						
Detector	Active Channels		Calibration Parameters			
	Start	End	A	B	C	D
S/N 00000007	61	451	8.675221E-9	-6.629224E-6	1.703235E-2	-1.669914E2
S/N 00000011	61	451	1.123196E-8	-8.658852E-6	2.002985E-2	1.582417E2

SPECTRUM DATA													
Psi	Sin^2(psi)	Peak Chnl	Intensity	FWHM	Peak Gross	Peak Net	2-Theta	Ka Corr	Ka2 Peak	D Spacing	Std. Dev.	Det. S/N	Flags
24.5	0.18184	154.74	141.2	1.47	46797	42374	161.518	N/A	163.509	0.780409	0.000037	00000007	B
41.5	0.44599	211.72	138.3	2.66	46099	41482	162.201	N/A	164.549	0.779666	0.000051	00000011	B

**TEC MAX Analysis Manager v1.0.26****Single Exposure Residual Stress Report**  
**8/12/2005 3:49:25 PM**

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**Description:** SBIR / AF Standard 19 / 0.10 from Edge / Hoop / jb  
(E:\SBIR - AF Standard 19 - 12Aug2005-03 54pm.set)

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STRESS RESULTS		
	KSI	MPa
<b>Residual Stress:</b>	-30.7809	-212.2264
<b>Counting Statistics Error (+/-):</b>	1.9061	13.1423

Fitted Delta D vs Sin^2(Psi)			
<b>D-Spacing Intercept:</b>	0.781016	<b>Slope of Fitted Line:</b>	-0.003275

MEASUREMENT PARAMETERS			
<b>Material Type [hkl]:</b>	Aluminum Alloy [333]	<b>Stress Constant:</b>	1.255E-7
<b>Depth:</b>	0.00	<b>Phi Angle:</b>	0.00
<b>Count Time:</b>	301.0 sec	<b>Collimator:</b>	5mm Collimator
<b>X-Ray Tube:</b>	Copper (Moxtek)	<b>X-Ray Wavelength:</b>	1.5406 Angs.
<b>Tube Voltage:</b>	26.0 KV	<b>Tube Current:</b>	80.000 uA
<b>Filter:</b>	Nickel	<b>Orientation:</b>	Omega

DETECTOR CALIBRATION PARAMETERS						
Detector	Active Channels		Calibration Parameters			
	Start	End	A	B	C	D
S/N 00000007	61	451	8.675221E-9	-6.629224E-6	1.703235E-2	-1.669914E2
S/N 00000011	61	451	1.123196E-8	-8.658852E-6	2.002985E-2	1.582417E2

SPECTRUM DATA													
Psi	Sin^2(psi)	Peak Chnl	Intensity	FWHM	Peak Gross	Peak Net	2-Theta	Ka Corr	Ka2 Peak	D Spacing	Std. Dev.	Det. S/N	Flags
24.5	0.18191	154.08	136.9	0.53	44830	41193	161.507	N/A	163.227	0.780420	0.000041	00000007	B
41.5	0.44511	217.42	135.8	2.63	41942	40863	162.303	N/A	164.842	0.779558	0.000027	00000011	B

# TEC MAX Analysis Manager v1.0.26

## Single Exposure Residual Stress Report

8/12/2005 12:38:37 PM

**Description:** SBIR / AF Standard 19 / 0.15 from Edge / Hoop / jb  
(C:\SBIR DATA FROM MAX\SBIR - AF Standard 19 - 12Aug2005-12 43pm.set)

STRESS RESULTS		
	KSI	MPa
<b>Residual Stress:</b>	2.1306	14.6902
<b>Counting Statistics Error (+/-):</b>	1.9367	13.3533

Fitted Delta D vs Sin^2(Psi)			
<b>D-Spacing Intercept:</b>	0.779952	<b>Slope of Fitted Line:</b>	0.000222

MEASUREMENT PARAMETERS			
<b>Material Type [hkl]:</b>	Aluminum Alloy [333]	<b>Stress Constant:</b>	1.255E-7
<b>Depth:</b>	0.00	<b>Phi Angle:</b>	0.00
<b>Count Time:</b>	301.0 sec	<b>Collimator:</b>	5mm Collimator
<b>X-Ray Tube:</b>	Copper (Moxtek)	<b>X-Ray Wavelength:</b>	1.5406 Angs.
<b>Tube Voltage:</b>	26.0 KV	<b>Tube Current:</b>	80.000 uA
<b>Filter:</b>	Nickel	<b>Orientation:</b>	Omega

DETECTOR CALIBRATION PARAMETERS						
Active Channels			Calibration Parameters			
Detector	Start	End	A	B	C	D
S/N 00000007	61	451	8.675221E-9	-6.629224E-6	1.703235E-2	-1.669914E2
S/N 00000011	61	451	1.123196E-8	-8.658852E-6	2.002985E-2	1.582417E2

SPECTRUM DATA													
Psi	Sin^2(psi)	Peak Chnl	Intensity	FWHM	Peak Gross	Peak Net	2-Theta	Ka Corr	Ka2 Peak	D Spacing	Std. Dev.	Det. S/N	Flags
24.5	0.17929	179.19	199.5	2.09	61753	60037	161.898	N/A	164.209	0.779992	0.000020	00000007	B
41.5	0.44910	191.72	157.5	2.17	54445	47395	161.843	N/A	164.150	0.780052	0.000047	00000011	B

# TEC MAX Analysis Manager v1.0.26

## Single Exposure Residual Stress Report

8/12/2005 4:26:19 PM

**Description:** SBIR / AF Standard 20 / 0.10 from Edge / Hoop / jb  
(C:\SBIR DATA FROM MAX\SBIR - AF Standard 20 - 12Aug2005-04 31pm.set)

STRESS RESULTS		
	KSI	MPa
Residual Stress:	-13.8069	-95.1953
Counting Statistics Error (+/-):	1.3697	9.4437

Fitted Delta D vs Sin^2(Psi)			
D-Spacing Intercept:	0.780116	Slope of Fitted Line:	-0.001427

MEASUREMENT PARAMETERS			
Material Type [hkl]:	Aluminum Alloy [333]	Stress Constant:	1.255E-7
Depth:	0.00	Phi Angle:	0.00
Count Time:	300.0 sec	Collimator:	5mm Collimator
X-Ray Tube:	Copper (Moxtek)	X-Ray Wavelength:	1.5406 Angs.
Tube Voltage:	26.0 KV	Tube Current:	80.000 uA
Filter:	Nickel	Orientation:	Omega

DETECTOR CALIBRATION PARAMETERS						
Active Channels			Calibration Parameters			
Detector	Start	End	A	B	C	D
S/N 00000007	61	451	8.675221E-9	-6.629224E-6	1.703235E-2	-1.669914E2
S/N 00000011	61	451	1.123196E-8	-8.658852E-6	2.002985E-2	1.582417E2

SPECTRUM DATA													
Psi	Sin^2(psi)	Peak Chnl	Intensity	FWHM	Peak Gross	Peak Net	2-Theta	Ka Corr	Ka2 Peak	D Spacing	Std. Dev.	Det. S/N	Flags
24.5	0.17848	187.00	136.5	2.03	41378	40944	162.018	N/A	164.345	0.779862	0.000029	00000007	B
41.5	0.44448	221.46	128.5	2.24	38799	38546	162.375	N/A	164.480	0.779482	0.000020	00000011	B

# TEC MAX Analysis Manager v1.0.26

## Single Exposure Residual Stress Report

8/12/2005 4:19:22 PM

**Description:** SBIR / AF Standard 20 / 0.15 from Edge / Hoop / jb  
(C:\SBIR DATA FROM MAX\SBIR - AF Standard 20 - 12Aug2005-04 24pm.set)

STRESS RESULTS		
	KSI	MPa
<b>Residual Stress:</b>	-9.5970	-66.1689
<b>Counting Statistics Error (+/-):</b>	1.0594	7.3046

Fitted Delta D vs Sin^2(Psi)			
<b>D-Spacing Intercept:</b>	0.780107	<b>Slope of Fitted Line:</b>	-0.000995

MEASUREMENT PARAMETERS			
<b>Material Type [hkl]:</b>	Aluminum Alloy [333]	<b>Stress Constant:</b>	1.255E-7
<b>Depth:</b>	0.00	<b>Phi Angle:</b>	0.00
<b>Count Time:</b>	300.0 sec	<b>Collimator:</b>	5mm Collimator
<b>X-Ray Tube:</b>	Copper (Moxtek)	<b>X-Ray Wavelength:</b>	1.5406 Angs.
<b>Tube Voltage:</b>	26.0 KV	<b>Tube Current:</b>	80.000 uA
<b>Filter:</b>	Nickel	<b>Orientation:</b>	Omega

DETECTOR CALIBRATION PARAMETERS						
Active Channels			Calibration Parameters			
Detector	Start	End	A	B	C	D
S/N 00000007	61	451	8.675221E-9	-6.629224E-6	1.703235E-2	-1.669914E2
S/N 00000011	61	451	1.123196E-8	-8.658852E-6	2.002985E-2	1.582417E2

SPECTRUM DATA													
Psi	Sin^2(psi)	Peak Chnl	Intensity	FWHM	Peak Gross	Peak Net	2-Theta	Ka Corr	Ka2 Peak	D Spacing	Std. Dev.	Det. S/N	Flags
24.5	0.17890	182.96	173.8	1.85	52659	52136	161.956	N/A	163.845	0.779929	0.000022	00000007	B
41.5	0.44597	211.89	192.0	0.76	58091	57605	162.204	N/A	164.141	0.779663	0.000017	00000011	B



# TEC MAX Analysis Manager v1.0.26

## Single Exposure Residual Stress Report

8/15/2005 5:03:42 PM

**Description:** SBIR / WP / Hole # 1 / CW Holes / Std. 7320-001 2024-T351 / 0.25" Hole / Front 0.05 from Edge of Hole / Hoop / JB  
(E:\SBIR - WP - Hole # 1 - 15Aug2005-05 08pm.mmt)

STRESS RESULTS		
	KSI	MPa
Residual Stress:	-20.2277	-139.4647
Counting Statistics Error (+/-):	1.5907	10.9675

Fitted Delta D vs Sin^2(Psi)			
D-Spacing Intercept:	0.780400	Slope of Fitted Line:	-0.002109

MEASUREMENT PARAMETERS			
Material Type [hkl]:	Al 5083-H23 [333]	Stress Constant:	1.255E-7
Depth:	0.00	Phi Angle:	0.00
Count Time:	300.0 sec	Collimator:	5mm Collimator
X-Ray Tube:	Copper (Moxtek)	X-Ray Wavelength:	1.5406 Angs.
Tube Voltage:	26.0 KV	Tube Current:	80.000 uA
Filter:	Nickel	Orientation:	Omega

DETECTOR CALIBRATION PARAMETERS						
Active Channels			Calibration Parameters			
Detector	Start	End	A	B	C	D
S/N 00000007	61	451	8.675221E-9	-6.629224E-6	1.703235E-2	-1.669914E2
S/N 00000011	61	451	1.123196E-8	-8.658852E-6	2.002985E-2	1.582417E2

SPECTRUM DATA													
Psi	Sin^2(psi)	Peak Chnl	Intensity	FWHM	Peak Gross	Peak Net	2-Theta	Ka Corr	Ka2 Peak	D Spacing	Std. Dev.	Det. S/N	Flags
24.5	0.17947	193.67	140.6	2.44	42655	42191	161.871	0.25070	N/A	0.780021	0.000022	00000007	
41.5	0.44433	223.57	7.9	1.08	2394	2366	162.393	0.01944	N/A	0.779463	0.000035	00000011	

# TEC MAX Analysis Manager v1.0.26

## Single Exposure Residual Stress Report 8/19/2005 10:28:32 AM

**Description:** SBIR / WP / Hole # 1 / CW Holes / Std. 7320-001 2024-T351 / 0.25" Hole / Front 0.10 from Edge of Hole / Hoop / JB  
(E:\SBIR - WP - Hole # 1 - 19Aug2005-10 33am.mmt)

STRESS RESULTS		
	KSI	MPa
Residual Stress:	-36.7802	-253.5899
Counting Statistics Error (+/-):	3.3365	23.0041

Fitted Delta D vs Sin^2(Psi)			
D-Spacing Intercept:	0.780940	Slope of Fitted Line:	-0.003879

MEASUREMENT PARAMETERS			
Material Type [hkl]:	Al 5083-H23 [333]	Stress Constant:	1.255E-7
Depth:	0.00	Phi Angle:	0.00
Count Time:	300.0 sec	Collimator:	5mm Collimator
X-Ray Tube:	Copper (Moxtek)	X-Ray Wavelength:	1.5406 Angs.
Tube Voltage:	26.0 KV	Tube Current:	80.000 uA
Filter:	Nickel	Orientation:	Omega

DETECTOR CALIBRATION PARAMETERS						
Detector	Active Channels		Calibration Parameters			
	Start	End	A	B	C	D
S/N 00000007	61	451	8.675221E-9	-6.629224E-6	1.703235E-2	-1.669914E2
S/N 00000011	61	451	1.123196E-8	-8.658852E-6	2.002985E-2	1.582417E2

SPECTRUM DATA													
Psi	Sin^2(psi)	Peak Chnl	Intensity	FWHM	Peak Gross	Peak Net	2-Theta	Ka Corr	Ka2 Peak	D Spacing	Std. Dev.	Det. S/N	Flags
24.5	0.18080	165.58	7.0	0.91	2125	2107	161.672	0.01424	N/A	0.780238	0.000030	00000007	
41.5	0.44235	236.65	4.2	1.19	1270	1258	162.621	0.02425	N/A	0.779224	0.000080	00000011	



# TEC MAX Analysis Manager v1.0.26

## Single Exposure Residual Stress Report 8/19/2005 11:09:22 AM

**Description:** SBIR / WP / Hole # 1 / CW Holes / Std. 7320-001 2024-T351 / 0.25" Hole / Front 0.15 from Edge of Hole / Hoop / JB  
(E:\SBIR - WP - Hole # 1 - 19Aug2005-11 14am.mmt)

STRESS RESULTS		
	KSI	MPa
Residual Stress:	-32.6647	-225.2146
Counting Statistics Error (+/-):	1.6634	11.4687

Fitted Delta D vs Sin^2(Psi)			
D-Spacing Intercept:	0.780770	Slope of Fitted Line:	-0.003430

MEASUREMENT PARAMETERS			
Material Type [hkl]:	Al 5083-H23 [333]	Stress Constant:	1.255E-7
Depth:	0.00	Phi Angle:	0.00
Count Time:	300.0 sec	Collimator:	5mm Collimator
X-Ray Tube:	Copper (Moxtek)	X-Ray Wavelength:	1.5406 Angs.
Tube Voltage:	26.0 KV	Tube Current:	80.000 uA
Filter:	Nickel	Orientation:	Omega

DETECTOR CALIBRATION PARAMETERS						
Detector	Active Channels		Calibration Parameters			
	Start	End	A	B	C	D
S/N 00000007	61	451	8.675221E-9	-6.629224E-6	1.703235E-2	-1.669914E2
S/N 00000011	61	451	1.123196E-8	-8.658852E-6	2.002985E-2	1.582417E2

SPECTRUM DATA													
Psi	Sin^2(psi)	Peak Chnl	Intensity	FWHM	Peak Gross	Peak Net	2-Theta	Ka Corr	Ka2 Peak	D Spacing	Std. Dev.	Det. S/N	Flags
24.5	0.18027	170.14	7.2	0.73	2221	2168	161.751	0.00597	N/A	0.780152	0.000028	00000007	
41.5	0.44258	234.68	6.5	0.99	1997	1948	162.594	0.01632	N/A	0.779252	0.000032	00000011	

# TEC MAX Analysis Manager v1.0.26

## Single Exposure Residual Stress Report 8/19/2005 11:21:18 AM

**Description:** SBIR / WP / Hole # 2 / CW Holes / Std. 7320-001 2024-T351 / 0.25" Hole / Front 0.05 from Edge of Hole / Hoop / J  
(E:\SBIR - WP - Hole # 2 - 19Aug2005-11 26am.mmt)

STRESS RESULTS		
	KSI	MPa
<b>Residual Stress:</b>	-22.8086	-157.2597
<b>Counting Statistics Error (+/-):</b>	2.8274	19.4945

Fitted Delta D vs Sin^2(Psi)			
<b>D-Spacing Intercept:</b>	0.780652	<b>Slope of Fitted Line:</b>	-0.002402

MEASUREMENT PARAMETERS			
<b>Material Type [hkl]:</b>	Al 5083-H23 [333]	<b>Stress Constant:</b>	1.255E-7
<b>Depth:</b>	0.00	<b>Phi Angle:</b>	0.00
<b>Count Time:</b>	300.0 sec	<b>Collimator:</b>	5mm Collimator
<b>X-Ray Tube:</b>	Copper (Moxtek)	<b>X-Ray Wavelength:</b>	1.5406 Angs.
<b>Tube Voltage:</b>	26.0 K V	<b>Tube Current:</b>	80.000 uA
<b>Filter:</b>	Nickel	<b>Orientation:</b>	Omega

DETECTOR CALIBRATION PARAMETERS						
Detector	Active Channels		Calibration Parameters			
	Start	End	A	B	C	D
S/N 00000007	61	451	8.675221E-9	-6.629224E-6	1.703235E-2	-1.669914E2
S/N 00000011	61	451	1.123196E-8	-8.658852E-6	2.002985E-2	1.582417E2

SPECTRUM DATA													
Psi	Sin^2(psi)	Peak Chnl	Intensity	FWHM	Peak Gross	Peak Net	2-Theta	Ka Corr	Ka2 Peak	D Spacing	Std. Dev.	Det. S/N	Flags
24.5	0.18068	182.88	144.5	3.00	43963	43337	161.691	0.26420	N/A	0.780218	0.000029	00000007	
41.5	0.44531	219.35	4.1	1.43	1261	1233	162.280	0.05741	N/A	0.779583	0.000067	00000011	

# TEC MAX Analysis Manager v1.0.26

## Single Exposure Residual Stress Report 8/19/2005 11:28:44 AM

**Description:** SBIR / WP / Hole # 2 / CW Holes / Std. 7320-001 2024-T351 / 0.25" Hole / Front 0.10 from Edge of Hole / Hoop / J  
(E:\SBIR - WP - Hole # 2 - 19Aug2005-11 33am.mmt)

STRESS RESULTS		
	KSI	MPa
Residual Stress:	-26.8241	-184.9450
Counting Statistics Error (+/-):	2.0893	14.4050

Fitted Delta D vs Sin^2(Psi)			
D-Spacing Intercept:	0.780769	Slope of Fitted Line:	-0.002831

MEASUREMENT PARAMETERS			
Material Type [hkl]:	Al 5083-H23 [333]	Stress Constant:	1.255E-7
Depth:	0.00	Phi Angle:	0.00
Count Time:	300.0 sec	Collimator:	5mm Collimator
X-Ray Tube:	Copper (Moxtek)	X-Ray Wavelength:	1.5406 Angs.
Tube Voltage:	26.0 KV	Tube Current:	80.000 uA
Filter:	Nickel	Orientation:	Omega

DETECTOR CALIBRATION PARAMETERS						
Detector	Active Channels		Calibration Parameters			
	Start	End	A	B	C	D
S/N 00000007	61	451	8.675221E-9	-6.629224E-6	1.703235E-2	-1.669914E2
S/N 00000011	61	451	1.123196E-8	-8.658852E-6	2.002985E-2	1.582417E2

SPECTRUM DATA													
Psi	Sin^2(psi)	Peak Chnl	Intensity	FWHM	Peak Gross	Peak Net	2-Theta	Ka Corr	Ka2 Peak	D Spacing	Std. Dev.	Det. S/N	Flags
24.5	0.18092	164.19	9.3	0.80	2846	2802	161.655	0.00938	N/A	0.780257	0.000029	00000007	
41.5	0.44471	221.04	6.9	1.07	2102	2071	162.348	0.01910	N/A	0.779510	0.000045	00000011	

# TEC MAX Analysis Manager v1.0.26

## Single Exposure Residual Stress Report 8/19/2005 11:36:07 AM

**Description:** SBIR / WP / Hole # 2 / CW Holes / Std. 7320-001 2024-T351 / 0.25" Hole / Front 0.15 from Edge of Hole / Hoop / J  
(E:\SBIR - WP - Hole # 2 - 19Aug2005-11 41am.mmt)

STRESS RESULTS		
	KSI	MPa
Residual Stress:	-15.8750	-109.4544
Counting Statistics Error (+/-):	1.8722	12.9087

Fitted Delta D vs Sin^2(Psi)			
D-Spacing Intercept:	0.780317	Slope of Fitted Line:	-0.001655

MEASUREMENT PARAMETERS			
Material Type [hkl]:	Al 5083-H23 [333]	Stress Constant:	1.255E-7
Depth:	0.00	Phi Angle:	0.00
Count Time:	300.0 sec	Collimator:	5mm Collimator
X-Ray Tube:	Copper (Moxtek)	X-Ray Wavelength:	1.5406 Angs.
Tube Voltage:	26.0 KV	Tube Current:	80.000 uA
Filter:	Nickel	Orientation:	Omega

DETECTOR CALIBRATION PARAMETERS						
Detector	Active Channels		Calibration Parameters			
	Start	End	A	B	C	D
S/N 00000007	61	451	8.675221E-9	-6.629224E-6	1.703235E-2	-1.669914E2
S/N 00000011	61	451	1.123196E-8	-8.658852E-6	2.002985E-2	1.582417E2

SPECTRUM DATA													
Psi	Sin^2(psi)	Peak Chnl	Intensity	FWHM	Peak Gross	Peak Net	2-Theta	Ka Corr	Ka2 Peak	D Spacing	Std. Dev.	Det. S/N	Flags
24.5	0.17946	177.79	8.3	0.68	2552	2503	161.872	0.00400	N/A	0.780020	0.000022	00000007	
41.5	0.44529	217.45	6.3	1.14	1913	1880	162.282	0.02139	N/A	0.779580	0.000043	00000011	

# TEC MAX Analysis Manager v1.0.26

## Single Exposure Residual Stress Report 8/19/2005 11:43:58 AM

**Description:** SBIR / WP / Hole # 3 / CW Holes / Std. 7320-001 2024-T351 / 0.25" Hole / Front 0.05 from Edge of Hole / Hoop / J  
(E:\SBIR - WP - Hole # 3 - 19Aug2005-11 48am.mmt)

STRESS RESULTS		
	KSI	MPa
<b>Residual Stress:</b>	-77.3703	-533.4483
<b>Counting Statistics Error (+/-):</b>	3.2287	22.2610

Fitted Delta D vs Sin^2(Psi)			
<b>D-Spacing Intercept:</b>	0.781741	<b>Slope of Fitted Line:</b>	-0.008185

MEASUREMENT PARAMETERS			
<b>Material Type [hkl]:</b>	Al 5083-H23 [333]	<b>Stress Constant:</b>	1.255E-7
<b>Depth:</b>	0.00	<b>Phi Angle:</b>	0.00
<b>Count Time:</b>	300.0 sec	<b>Collimator:</b>	5mm Collimator
<b>X-Ray Tube:</b>	Copper (Moxtek)	<b>X-Ray Wavelength:</b>	1.5406 Angs.
<b>Tube Voltage:</b>	26.0 KV	<b>Tube Current:</b>	80.000 uA
<b>Filter:</b>	Nickel	<b>Orientation:</b>	Omega

DETECTOR CALIBRATION PARAMETERS						
Detector	Active Channels		Calibration Parameters			
	Start	End	A	B	C	D
S/N 00000007	61	451	8.675221E-9	-6.629224E-6	1.703235E-2	-1.669914E2
S/N 00000011	61	451	1.123196E-8	-8.658852E-6	2.002985E-2	1.582417E2

SPECTRUM DATA													
Psi	Sin^2(psi)	Peak Chnl	Intensity	FWHM	Peak Gross	Peak Net	2-Theta	Ka Corr	Ka2 Peak	D Spacing	Std. Dev.	Det. S/N	Flags
24.5	0.18094	164.63	7.4	1.04	2253	2205	161.652	0.01914	N/A	0.780260	0.000077	00000007	
41.5	0.43349	309.65	115.2	3.81	36897	34551	163.645	0.30272	N/A	0.778193	0.000020	00000011	

# TEC MAX Analysis Manager v1.0.26

## Single Exposure Residual Stress Report 8/19/2005 11:51:45 AM

**Description:** SBIR / WP / Hole # 3 / CW Holes / Std. 7320-001 2024-T351 / 0.25" Hole / Front 0.10 from Edge of Hole / Hoop / J  
(E:\SBIR - WP - Hole # 3 - 19Aug2005-11 56am.mmt)

STRESS RESULTS		
	KSI	MPa
Residual Stress:	-52.9253	-364.9067
Counting Statistics Error (+/-):	1.4048	9.6856

Fitted Delta D vs Sin^2(Psi)			
D-Spacing Intercept:	0.781035	Slope of Fitted Line:	-0.005530

MEASUREMENT PARAMETERS			
Material Type [hkl]:	Al 5083-H23 [333]	Stress Constant:	1.255E-7
Depth:	0.00	Phi Angle:	0.00
Count Time:	300.0 sec	Collimator:	5mm Collimator
X-Ray Tube:	Copper (Moxtek)	X-Ray Wavelength:	1.5406 Angs.
Tube Voltage:	26.0 KV	Tube Current:	80.000 uA
Filter:	Nickel	Orientation:	Omega

DETECTOR CALIBRATION PARAMETERS						
Detector	Active Channels		Calibration Parameters			
	Start	End	A	B	C	D
S/N 00000007	61	451	8.675221E-9	-6.629224E-6	1.703235E-2	-1.669914E2
S/N 00000011	61	451	1.123196E-8	-8.658852E-6	2.002985E-2	1.582417E2

SPECTRUM DATA													
Psi	Sin^2(psi)	Peak Chnl	Intensity	FWHM	Peak Gross	Peak Net	2-Theta	Ka Corr	Ka2 Peak	D Spacing	Std. Dev.	Det. S/N	Flags
24.5	0.17960	176.39	7.1	0.65	2156	2124	161.852	0.00253	N/A	0.780042	0.000028	00000007	
41.5	0.43720	269.31	14.3	0.91	4359	4288	163.215	0.01217	N/A	0.778618	0.000022	00000011	

# TEC MAX Analysis Manager v1.0.26

## Single Exposure Residual Stress Report

8/19/2005 11:57:51 AM

**Description:** SBIR / WP / Hole # 3 / CW Holes / Std. 7320-001 2024-T351 / 0.25" Hole / Front 0.15 from Edge of Hole / Hoop / J  
(E:\SBIR - WP - Hole # 3 - 19Aug2005-12 02pm.set)

STRESS RESULTS		
	KSI	MPa
Residual Stress:	-12.6008	-86.8794
Counting Statistics Error (+/-):	1.1041	7.6124

Fitted Delta D vs Sin^2(Psi)			
D-Spacing Intercept:	0.780418	Slope of Fitted Line:	-0.001324

MEASUREMENT PARAMETERS			
Material Type [hkl]:	Al 5083-H23 [333]	Stress Constant:	1.255E-7
Depth:	0.00	Phi Angle:	0.00
Count Time:	300.0 sec	Collimator:	5mm Collimator
X-Ray Tube:	Copper (Moxtek)	X-Ray Wavelength:	1.5406 Angs.
Tube Voltage:	26.0 KV	Tube Current:	80.000 uA
Filter:	Nickel	Orientation:	Omega

DETECTOR CALIBRATION PARAMETERS						
Detector	Active Channels		Calibration Parameters			
	Start	End	A	B	C	D
S/N 00000007	61	451	8.675221E-9	-6.629224E-6	1.703235E-2	-1.669914E2
S/N 00000011	61	451	1.123196E-8	-8.658852E-6	2.002985E-2	1.582417E2

SPECTRUM DATA													
Psi	Sin^2(psi)	Peak Chnl	Intensity	FWHM	Peak Gross	Peak Net	2-Theta	Ka Corr	Ka2 Peak	D Spacing	Std. Dev.	Det. S/N	Flags
24.5	0.18044	168.14	222.9	1.96	74310	66857	161.726	N/A	163.861	0.780179	0.000023	00000007	B
41.5	0.44729	203.39	252.7	1.27	76912	75823	162.052	N/A	163.995	0.779826	0.000017	00000011	B

# TEC MAX Analysis Manager v1.0.26

## Single Exposure Residual Stress Report 8/19/2005 12:04:12 PM

**Description:** SBIR / WP / Hole # 4 / CW Holes / Std. 7320-001 2024-T351 / 0.25" Hole / Front 0.05 from Edge of Hole / Hoop / JB  
(E:\SBIR - WP - Hole # 4 - 19Aug2005-12 09pm.mmt)

STRESS RESULTS		
	KSI	MPa
Residual Stress:	-38.9161	-268.3166
Counting Statistics Error (+/-):	2.2946	15.8208

Fitted Delta D vs Sin^2(Psi)			
D-Spacing Intercept:	0.781088	Slope of Fitted Line:	-0.004126

MEASUREMENT PARAMETERS			
Material Type [hkl]:	Al 5083-H23 [333]	Stress Constant:	1.255E-7
Depth:	0.00	Phi Angle:	0.00
Count Time:	300.0 sec	Collimator:	5mm Collimator
X-Ray Tube:	Copper (Moxtek)	X-Ray Wavelength:	1.5406 Angs.
Tube Voltage:	26.0 KV	Tube Current:	80.000 uA
Filter:	Nickel	Orientation:	Omega

DETECTOR CALIBRATION PARAMETERS						
Detector	Active Channels		Calibration Parameters			
	Start	End	A	B	C	D
S/N 00000007	61	451	8.675221E-9	-6.629224E-6	1.703235E-2	-1.669914E2
S/N 00000011	61	451	1.123196E-8	-8.658852E-6	2.002985E-2	1.582417E2

SPECTRUM DATA													
Psi	Sin^2(psi)	Peak Chnl	Intensity	FWHM	Peak Gross	Peak Net	2-Theta	Ka Corr	Ka2 Peak	D Spacing	Std. Dev.	Det. S/N	Flags
24.5	0.18142	159.73	12.0	0.91	3653	3599	161.581	0.01466	N/A	0.780339	0.000041	00000007	
41.5	0.44266	249.07	83.8	3.38	25950	25144	162.585	0.28146	N/A	0.779261	0.000042	00000011	



# TEC MAX Analysis Manager v1.0.26

## Single Exposure Residual Stress Report 8/19/2005 12:10:01 PM

**Description:** SBIR / WP / Hole # 4 / CW Holes / Std. 7320-001 2024-T351 / 0.25" Hole / Front 0.10 from Edge of Hole / Hoop / JB  
(E:\SBIR - WP - Hole # 4 - 19Aug2005-12 15pm.mmt)

STRESS RESULTS		
	KSI	MPa
Residual Stress:	-20.6846	-142.6151
Counting Statistics Error (+/-):	4.2609	29.3778

Fitted Delta D vs Sin^2(Psi)			
D-Spacing Intercept:	0.780436	Slope of Fitted Line:	-0.002159

MEASUREMENT PARAMETERS			
Material Type [hkl]:	Al 5083-H23 [333]	Stress Constant:	1.255E-7
Depth:	0.00	Phi Angle:	0.00
Count Time:	301.0 sec	Collimator:	5mm Collimator
X-Ray Tube:	Copper (Moxtek)	X-Ray Wavelength:	1.5406 Angs.
Tube Voltage:	26.0 KV	Tube Current:	80.000 uA
Filter:	Nickel	Orientation:	Omega

DETECTOR CALIBRATION PARAMETERS						
Detector	Active Channels		Calibration Parameters			
	Start	End	A	B	C	D
S/N 00000007	61	451	8.675221E-9	-6.629224E-6	1.703235E-2	-1.669914E2
S/N 00000011	61	451	1.123196E-8	-8.658852E-6	2.002985E-2	1.582417E2

SPECTRUM DATA													
Psi	Sin^2(psi)	Peak Chnl	Intensity	FWHM	Peak Gross	Peak Net	2-Theta	Ka Corr	Ka2 Peak	D Spacing	Std. Dev.	Det. S/N	Flags
24.5	0.17963	175.91	8.2	0.53	2498	2459	161.847	0.00025	N/A	0.780048	0.000022	00000007	
41.5	0.44443	223.21	4.2	1.25	1268	1254	162.381	0.02546	N/A	0.779476	0.000108	00000011	

# TEC MAX Analysis Manager v1.0.26

## Single Exposure Residual Stress Report

8/19/2005 12:16:02 PM

**Description:** SBIR / WP / Hole # 4 / CW Holes / Std. 7320-001 2024-T351 / 0.25" Hole / Front 0.15 from Edge of Hole / Hoop / JB  
(E:\SBIR - WP - Hole # 4 - 19Aug2005-12 21pm.mmt)

STRESS RESULTS		
	KSI	MPa
Residual Stress:	-16.8144	-115.9308
Counting Statistics Error (+/-):	2.1146	14.5796

Fitted Delta D vs Sin^2(Psi)			
D-Spacing Intercept:	0.780329	Slope of Fitted Line:	-0.001752

MEASUREMENT PARAMETERS			
Material Type [hkl]:	Al 5083-H23 [333]	Stress Constant:	1.255E-7
Depth:	0.00	Phi Angle:	0.00
Count Time:	300.0 sec	Collimator:	5mm Collimator
X-Ray Tube:	Copper (Moxtek)	X-Ray Wavelength:	1.5406 Angs.
Tube Voltage:	26.0 KV	Tube Current:	80.000 uA
Filter:	Nickel	Orientation:	Omega

DETECTOR CALIBRATION PARAMETERS						
Detector	Active Channels		Calibration Parameters			
	Start	End	A	B	C	D
S/N 00000007	61	451	8.675221E-9	-6.629224E-6	1.703235E-2	-1.669914E2
S/N 00000011	61	451	1.123196E-8	-8.658852E-6	2.002985E-2	1.582417E2

SPECTRUM DATA													
Psi	Sin^2(psi)	Peak Chnl	Intensity	FWHM	Peak Gross	Peak Net	2-Theta	Ka Corr	Ka2 Peak	D Spacing	Std. Dev.	Det. S/N	Flags
24.5	0.17943	178.64	8.7	0.86	2641	2605	161.877	0.01231	N/A	0.780015	0.000029	00000007	
41.5	0.44504	219.63	7.1	1.29	2139	2118	162.311	0.03114	N/A	0.779549	0.000047	00000011	

# TEC MAX Analysis Manager v1.0.26

## Single Exposure Residual Stress Report

8/19/2005 12:22:09 PM

**Description:** SBIR / WP / Hole # 5 / CW Holes / Std. 7320-001 2024-T351 / 0.25" Hole / Front 0.05 from Edge-of Hole / Hoop / JB  
(E:\SBIR - WP - Hole # 5 - 19Aug2005-12 27pm.mmt)

STRESS RESULTS		
	KSI	MPa
Residual Stress:	-38.6753	-266.6561
Counting Statistics Error (+/-):	3.6740	25.3314

Fitted Delta D vs Sin^2(Psi)			
D-Spacing Intercept:	0.780816	Slope of Fitted Line:	-0.004048

MEASUREMENT PARAMETERS			
Material Type [hkl]:	Al 5083-H23 [333]	Stress Constant:	1.255E-7
Depth:	0.00	Phi Angle:	0.00
Count Time:	300.0 sec	Collimator:	5mm Collimator
X-Ray Tube:	Copper (Moxtek)	X-Ray Wavelength:	1.5406 Angs.
Tube Voltage:	26.0 KV	Tube Current:	80.000 uA
Filter:	Nickel	Orientation:	Omega

DETECTOR CALIBRATION PARAMETERS						
Detector	Active Channels		Calibration Parameters			
	Start	End	A	B	C	D
S/N 00000007	61	451	8.675221E-9	-6.629224E-6	1.703235E-2	-1.669914E2
S/N 00000011	61	451	1.123196E-8	-8.658852E-6	2.002985E-2	1.582417E2

SPECTRUM DATA													
Psi	Sin^2(psi)	Peak Chnl	Intensity	FWHM	Peak Gross	Peak Net	2-Theta	Ka Corr	Ka2 Peak	D Spacing	Std. Dev.	Det. S/N	Flags
24.5	0.17988	174.20	6.9	0.82	2092	2055	161.810	0.01024	N/A	0.780088	0.000031	00000007	
41.5	0.44073	262.05	86.4	3.90	27862	25915	162.807	0.29053	N/A	0.779032	0.000089	00000011	

# TEC MAX Analysis Manager v1.0.26

## Single Exposure Residual Stress Report

8/19/2005 12:27:56 PM

**Description:** SBIR / WP / Hole # 5 / CW Holes / Std. 7320-001 2024-T351 / 0.25" Hole / Front 0.10 from Edge of Hole / Hoop / JB  
(E:\SBIR - WP - Hole # 5 - 19Aug2005-12 32pm.mmt)

STRESS RESULTS		
	KSI	MPa
Residual Stress:	-19.9917	-137.8380
Counting Statistics Error (+/-):	3.0677	21.1511

Fitted Delta D vs Sin^2(Psi)			
D-Spacing Intercept:	0.780788	Slope of Fitted Line:	-0.002124

MEASUREMENT PARAMETERS			
Material Type [hkl]:	Al 5083-H23 [333]	Stress Constant:	1.255E-7
Depth:	0.00	Phi Angle:	0.00
Count Time:	300.0 sec	Collimator:	5mm Collimator
X-Ray Tube:	Copper (Moxtek)	X-Ray Wavelength:	1.5406 Angs.
Tube Voltage:	26.0 KV	Tube Current:	80.000 uA
Filter:	Nickel	Orientation:	Omega

DETECTOR CALIBRATION PARAMETERS						
Active Channels			Calibration Parameters			
Detector	Start	End	A	B	C	D
S/N 00000007	61	451	8.675221E-9	-6.629224E-6	1.703235E-2	-1.669914E2
S/N 00000011	61	451	1.123196E-8	-8.658852E-6	2.002985E-2	1.582417E2

SPECTRUM DATA													
Psi	Sin^2(psi)	Peak Chnl	Intensity	FWHM	Peak Gross	Peak Net	2-Theta	Ka Corr	Ka2 Peak	D Spacing	Std. Dev.	Det. S/N	Flags
24.5	0.18180	156.28	10.8	0.99	3329	3246	161.524	0.01781	N/A	0.780402	0.000046	00000007	
41.5	0.44738	214.82	6.7	1.96	2029	2003	162.041	0.21560	N/A	0.779838	0.000065	00000011	

# TEC MAX Analysis Manager v1.0.26

## Single Exposure Residual Stress Report

8/19/2005 12:33:44 PM

**Description:** SBIR / WP / Hole # 5 / CW Holes / Std. 7320-001 2024-T351 / 0.25" Hole / Front 0.15 from Edge of Hole / Hoop / JB  
(E:\SBIR - WP - Hole # 5 - 19Aug2005-12 38pm.mmt)

STRESS RESULTS		
	KSI	MPa
Residual Stress:	-48.3702	-333.5002
Counting Statistics Error (+/-):	6.3705	43.9227

Fitted Delta D vs Sin^2(Psi)			
D-Spacing Intercept:	0.781496	Slope of Fitted Line:	-0.005185

MEASUREMENT PARAMETERS			
Material Type [hkl]:	Al 5083-H23 [333]	Stress Constant:	1.255E-7
Depth:	0.00	Phi Angle:	0.00
Count Time:	300.0 sec	Collimator:	5mm Collimator
X-Ray Tube:	Copper (Moxtek)	X-Ray Wavelength:	1.5406 Angs.
Tube Voltage:	26.0 KV	Tube Current:	80.000 uA
Filter:	Nickel	Orientation:	Omega

DETECTOR CALIBRATION PARAMETERS						
Detector	Active Channels		Calibration Parameters			
	Start	End	A	B	C	D
S/N 00000007	61	451	8.675221E-9	-6.629224E-6	1.703235E-2	-1.669914E2
S/N 00000011	61	451	1.123196E-8	-8.658852E-6	2.002985E-2	1.582417E2

SPECTRUM DATA													
Psi	Sin^2(psi)	Peak Chnl	Intensity	FWHM	Peak Gross	Peak Net	2-Theta	Ka Corr	Ka2 Peak	D Spacing	Std. Dev.	Det. S/N	Flags
24.5	0.18269	148.35	6.5	1.18	1984	1952	161.392	0.02619	N/A	0.780549	0.000153	00000007	
41.5	0.44218	238.97	6.0	1.41	1819	1794	162.641	0.04623	N/A	0.779204	0.000051	00000011	